APRIL, 1959

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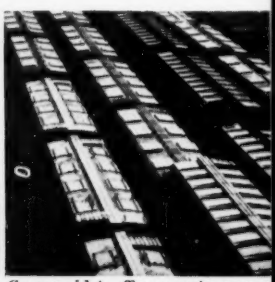
Cyanamid technical representatives are trained in all phases of fertilizer manufacture. They can follow your process through from our delivery to yours. Here the Cyanamid man checks with chemist analyzing samples of mixed fertilizer before bagging.



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To manufacture fertilizers that sell.

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Commenting Freely

by BRUCE MORAN

Are we destroying the land so completely that "there are many sections in Asia, the Americas, the Mediterranean areas and Africa that are in complete ruin"? Do we "cut, burn, plant, destroy and move on"? Is South America a "vanishing continent" as the Pan American Union says it is? Will fifty years see the State of Oaxaca, Mexico a desert?

These are random quotes from an answer to "Why Go Into Space" in a book called "Spacepower" which has just been published. Exodus Earth will be a necessity these authors claim because of the soil depletion problem coupled with growing population which the soil can no longer feed.

This is a serious book, and the charge that present destruction if allowed to continue "will some day render this planet as dead as the moon" is not meant to be taken lightly by the distinguished authors. It was chosen by the Literary Guild as a book of the month. It was published by the John S. Winston Co., Philadelphia and Toronto.

Maybe you'd like to read that first chapter yourself! Where there's smoke there must be some fire . . . and this one spells Opportunity for our industry.

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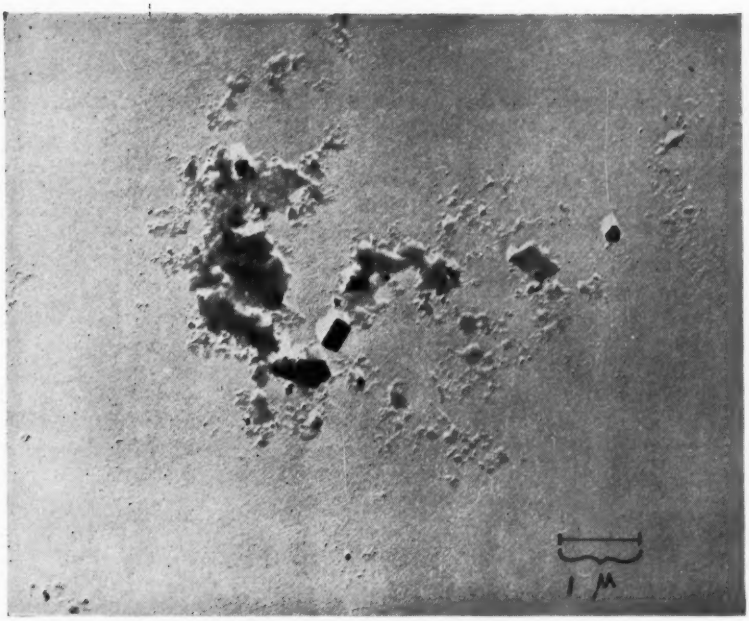
Technical Factual Information Through Research



Electronphotomicrograph, TAKO

Magnification 4 (Negative, 5100 diameters; print, 15,000 diameters). On the print, 1mm corresponds to 0.067 microns. Distinct rectangular forms are observed in the range from 0.07 to 0.4 microns in length. Less definite evidence is seen for particles of still smaller size.

pH Value 4.4
Bulk Density—lbs. cu. ft.
Loose—Approx. 20 lbs.
Packed— " 41 "
Porosity 130%
Specific Surface—(CM^2-22,700)
Particle Type—Crystal Flat Rectangular Plates and Crystal Aggregates
Specific Gravity—2.62
Particle Size Distribution—Sedimentation, using Andraesen Pipette Procedure

SIZE (Microns)	EQUAL or Finer %	GROUP %
.5		54.0
.5	54.0	
1.0	64.0	10.0
2.0	75.6	11.6
3.0	81.9	6.3
4.0	85.5	3.6
5.0	87.6	2.1
6.0	89.9	2.3
7.0	91.8	1.9
8.0	92.7	0.9
9.0	93.8	1.1
10.0	94.3	.5
10.0		5.7

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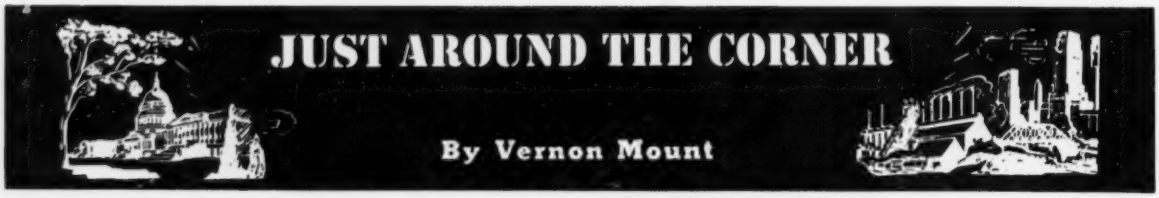

WORRY LESS about what Congress may be doing to the inflation picture, and more about Steel, which can trigger a whole new spiral. Steel is the bellwether of inflation—because it affects almost everything we have or do, and because wage contracts in Steel set a pattern. As Steel goes, so goes the nation!

INVENTORY building seems to be on a reasonable scale. Many sound thinkers believe the climb of Gross National Product will absorb that inventory, and demand more. The third quarter may be a doubtful period, but they believe the fourth quarter will put things back on the track . . . which is definitely upward and onward.

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Does The Plant Lose Money?

And Why?

By A Plant Superintendent.

THE writer of this article is a man who is now superintendent of a fertilizer plant. He had read the articles in the March issue and this was his supplement to those.

"You hardly ever hear anything relative to losses in plant operation," says he, "and my years of experience and observation both with large corporations and independent companies, prompts the enclosed letter for publication."

We welcome the opportunity to publish the letter, hoping that it will be followed by others bearing on pertinent subjects.

—The Editor.—

THE March issue of the COMMERCIAL FERTILIZER was a most interesting number. The articles from executives in the fertilizer and allied industries were well worth while, containing information that is applicable and helpful to many in the business.

Taking note of the fact that your correspondents were replying to the question of how to make money in the fertilizer business, it occurs to the writer that you and others may be interested in what the plant Superintendent thinks about the situation generally.

You know, we fellows have always resented the fact that a variation of five cents in cost per ton in manufacturing and shipping required an explanation, whereas the Sales department can make a cut of 50 cents to $2.00 per ton and get away with it. So we wonder sometimes, if our efforts are worth while.

While we believe the nickel should have the same value and prestige in the sales office as in the plant, we have got to admit there are losses at the plant, but they do not get the publicity they really need. However, it is only on rare occasions when manufacturing and shipping losses will equal those of the Sales, but in most instances where there are plant losses they are definite and continuous, whereas the Sales department makes a killing once in a while.

To intimate the probability of preventable losses at the plant no doubt would put most of the factory managers and even the Superintendents on the defensive. Some of the losses are through pure ignorance, so it would be well for all concerned to check at regular intervals, or better still, adopt eternal vigilance. Repairs, replacements, and general upkeep of plant equipment can be maintained for years on an even regular schedule, better than to continually delay such matters until it is necessary for large appropriations being made, for that is about the time the stockholders are clamoring for their 8 per cent. Generally, too, the combined losses of manufacturing, shipping, and sales, is a good excuse for not replacing that obsolete machinery with new and up to date equipment that was planned for earlier in the season. This part of the whole works is the first to feel the brunt of a bad year; my own conclusion is that it should be the last.

Saving money, even in small amounts, in prevention of plant losses in operation is just as important as making money on the selling end; yet it was noticeable that in the responses you received, this particular phase was not covered, (excepting the deductions that could be drawn from the timely articles on equipment). The losses in the sales department become public knowledge through conditions by which they can not well be kept hidden, but the fact that the factory operation losses can be withheld, even from competitors, is sometimes mistaken by the management also, and it is assumed there are none.

The large Companies and Corporations have within the last decade brought their manufacturing departments to a high state of efficiency; some never content, but continually at work on every lead that might result in lower costs. Many of them work under a standard system as regards both equipment and plant operations, with every plant on a competitive basis. Some provide their plants with an instruction book, anticipating and covering every problem the Superintendent is likely to meet. Such efforts have resulted in splendid efficiency and saving yet they still have minor losses.

It is in many of the independent plants where the greater losses are generally found. As a rule they do not equip themselves with the facilities like the large Companies, to maintain a constant experimental system in connection with the manufacturing program; they have little or no means of learning the gradual improvements made under these conditions elsewhere, and it is not likely that these details become common knowledge. Many of their Superintendents are men who have been at the plant for years, content to use the anitquated methods of the past, ignorant of the progress really

made; sometimes apt to discredit the use of labor saving equipment.

Only several years ago, and just as the Spring business was approaching, the writer had occasion to make a survey of the working conditions of what is classed as a modern plant; was working in competition with other companies, and trying to retain its old established business. A stock of phosphate containing 12,000 tons showed a potential loss of $4,000 in insoluble phosphoric acid, the figures being arrived at by checking the exden sample results and numerous test samples from the pile. A shortage of phosphate rock, predicted at the time, later on came true. This loss could have been prevented by maintaining the equipment in satisfactory condition, and by intelligent supervision.

In the basing up of 4,000 tons of mixed goods preparatory to shipping, 25 to 30 cents per ton could have been saved if the various materials received and unloaded had been stored in close proximity to the basing machine, instead of indifferently piling them here and there throughout the plant. Unnecessary rehandling and long hauls of materials at any time should be classed as a criminal offense.

In the formulating it had been the policy of the Company to allow very liberal overages, and a check on the previous year's business, while not possible to arrive at actual figures, showed losses so great as to prove such liberal overages in these days of high priced organics to be bad practice. It may have been all right twenty years ago. It was found that these losses were augmented to some extent by faulty and crude methods employed in the batching operations. If we add to these then, and there was reason to suspect it, the probability of indifferent weighing from the hoppers to the bag, such a state of affairs should give Company officials something to ponder over before the Sales department takes over the tonnage, later perhaps becoming demoralized and following the usual course.

It would pay a number of Companies that have come under the writer's observation in recent years to have an Engineer make a thorough survey of their plants every two or three years, recommending such changes and working methods that would save thousands of dollars; at least keep them somewhat in line with progressive concerns. Sometimes the management discourages this line of thought on the part of the Superintendent; rather there is a tendency to curb his extravagant requests. It is amazing but true, the number of mechanical and millwright errors that are clearly apparent to the trained man who has opportunity of noting the layout of some plants. Power and labor could be saved to great extent. There are industries allied to the fertilizer trade that maintain such Engineers available for this purpose, and the writer says, advisedly, give them the opportunity. Again, it is mainly independent plants that are so affected.

If the average manager does not have time when visiting the plant to do other than walk through and around, ask a few questions, pass on one matter or another, there are other methods of keeping in touch with actual operations.

When in charge of a Southern plant some years ago, the writer enjoyed the confidence and co-operation of the President who was also the General Manager. Regularly week after week, absence from the city being the only cause for omission, an hour's conference was held every Monday afternoon; weekly reports, payroll, everything gone through in regular order of business, and so thorough as to keep that official posted in every detail of the plant work. Other business could wait, his golf could wait, and worthy of mention, the plant made money.

A company is bound to have hidden and undetermined loss when the operation of the plant is in charge of one who may have other interests which prevent whole time service being given to plant operations. It is a fact that things click only all down the line when the man in charge is on the job himself. Observation of years prove this to be true.

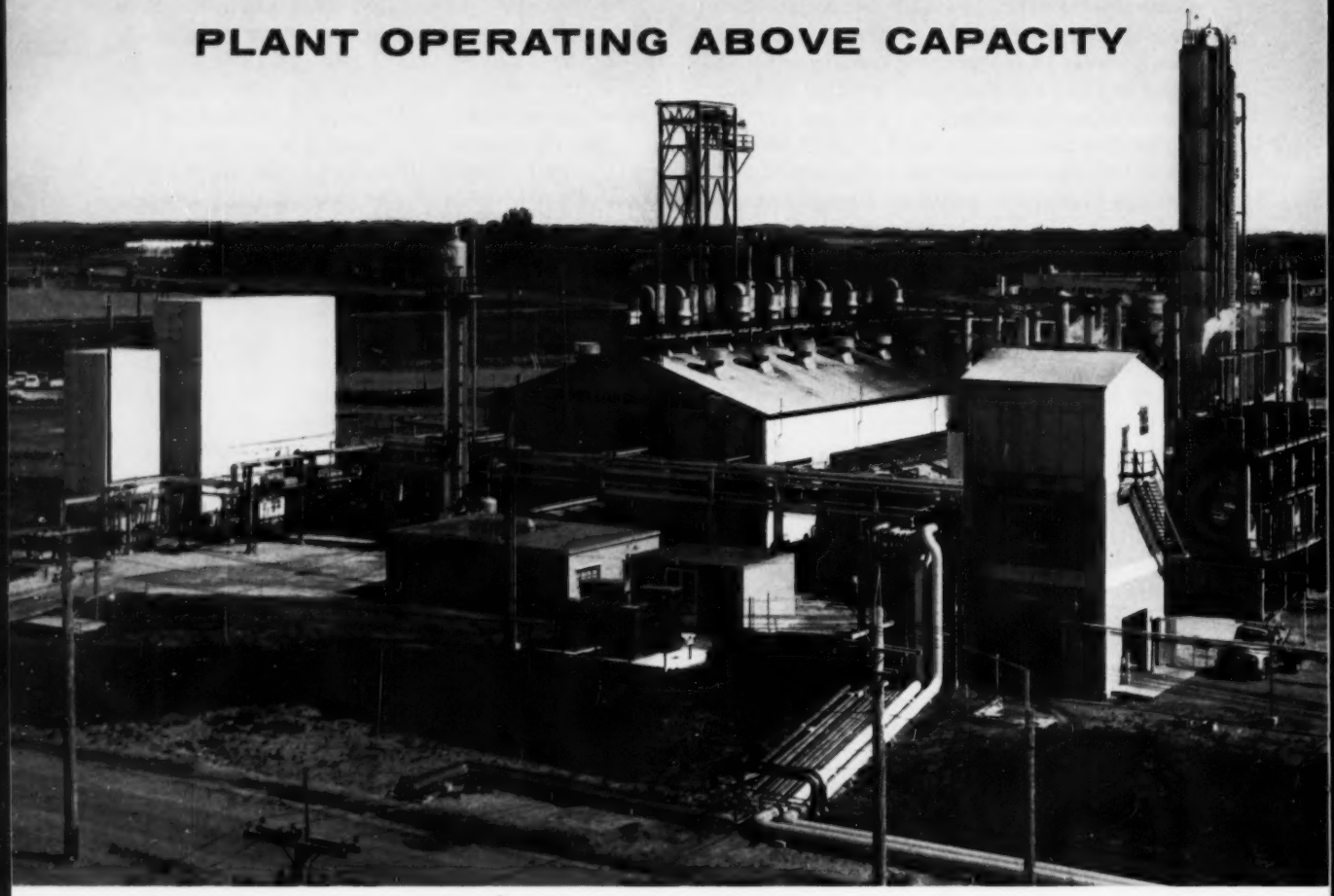
Most companies have a rule prohibiting the loaning of money at interest to the employees, in itself a most debasing practice, soon tending to demoralize the laborers, often preventing the Company from getting service or even justice, for discrimination soon takes place and many a man not worthy of his hire remains upon the payroll. There are a number of ways to beat the standing order, and so the business still flourishes in many forbidden places.

Some plants, too, are afflicted by the blight of the great national pastime of petty graft, often beginning in a small way and perhaps by favors shown, until it reaches a point where ownership is hard to define. To stop these leaks and everyone maintain their self respect is for a complete showdown and specific understanding.

Theer is no argument against the fact that we have reached the place in manufacturing and shipping, in fact all factory operations, where efficiency, accuracy, and honesty must be slogans to guarantee continual operation at a profit, for there are few other industries that have to contend, under competition, with so many elements of chance, and the penalty for obsolete methods and equipment, not including losses on Sales, must be disaster.

The fertilizer industry with its great problems might be likened to Sisyphus, the Greek God, who for his shortcomings, (as we have ours) was condemned by Pluto to keep rolling the ball up the mountain, as it continually rolled back to him. Did it never occur to him that the way out was to put the ball clean over the mountain top?

ST. PAUL AMMONIA PRODUCTS, INC.
PLANT OPERATING ABOVE CAPACITY



Ammonia Plant—Designed, Engineered and Constructed by Lummus—Feeds Natural Gas or Butane

The St. Paul Ammonia Products, Inc. ammonia products plant at Pine Bend, Minnesota, has been operating at rates above the design capacity of 200 tons per day of ammonia. This operating record is a result of Lummus' policy of close cooperation with the client at every stage. Lummus' years of experience in plant design and construction have been effectively combined with the years of experience in plant operation of St. Paul Ammonia's capable staff in order to achieve a successful project.

In addition to producing anhydrous ammonia and ammonium nitrate solutions for the fertilizer industry, St. Paul also produces anhydrous ammonia meeting industrial specifications.

St. Paul Ammonia employs the Texaco Synthesis Gas Generation Process to produce hydrogen for ammonia synthesis. During most of the year, natural gas direct from the pipeline is the raw material. However, during the cold Minnesota winters the supply of natural gas is interrupted, giving preference to household users. The plant is designed so that at these times butane is used as the raw material.

The large compressors are gas-engine driven and use natural gas fuel except during the winter months, when propane from storage tanks is employed. The Lummus design fits the plant to the needs of the area and permits this sort of flexible operation.

This plant utilizes a hot potassium carbonate system for removal of CO_2, which helps reduce production costs.

Lummus acted as general contractors for the entire project which includes ammonia synthesis, nitric acid, and ammonium nitrate solutions units, and offsite facilities including utilities, tankage and product shipping.

Lummus has experience in design and operation of ammonia plants utilizing: heavy fuel oil—where natural gas is not available—and waste chlorine cell hydrogen. Capacities of Lummus built ammonia plants range from 60 to 300 tons per day.

In the past 50 years, Lummus has built over 800 plants to produce petrochemicals, chemicals and petroleum products. If your company is planning facilities of this kind, discuss your plans with Lummus.

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Du Pont UAL-37 furnishes nitrogen in three forms—ammonia, soluble organic (urea), and insoluble organic. One-fifth of the nitrogen is the insoluble portion. It's of proven high agronomic value, particularly for long-season crops and grasses.

The insoluble nitrogen supplied in UAL-37 is long-feeding, of the ureaform type. Its continuous rate of nitrification yields available plant food long after soluble forms have been exhausted.

Take advantage of the growing trend toward long-feeding fertilizer materials with UAL-37. Du Pont specialists can give you at-the-plant advice, and stand ready to assist you in profitably formulating mixtures containing UAL-37. For further information on UAL-37, fill out and mail the coupon.

HERE ARE OTHER IMPORTANT ADVANTAGES OF DU PONT UAL-37

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The Most Dynamic Changes in Fertilizer History

In summary, then, I would say that the fertilizer industry of today is undergoing the most rapid changes of its entire history—changes in technology and in use. These changes have led to needs for tremendous amounts of research of the entire fertilizer industry from the point of prime manufacturer of raw materials to the farmer. They have led to a need for additional research in the production functions and the distribution function. At the same time there have developed needs for much additional research in educational methods and procedures.

by Sheldon L. Clement, *Chief, Fertilizer Distribution Branch*
Tennessee Valley Authority, Division of Agricultural Relations

The fertilizer industry of today is undergoing the most dynamic changes in its entire history. These changes have resulted both from advances in manufacturing technology of prime materials, in mixing, and through changes in marketing procedures. Since World War II use of fertilizers in the United States has more than doubled and this increase in use promises to continue. At the same time the industry has been growing in total size, significant changes within the industry have occurred.

Today's nitrogen industry is almost a completely new industry. Now it uses chemicals or petrochemicals rather than organics, byproducts, and imports as it did prior to World War II. It is characterized by new technology, new products, relatively lower prices for products, new geographical points of production, new combinations of chemicals, and new companies.

The phosphate industry, although not a new industry within itself, is producing new products, higher analysis products and more economical products in terms of costs to farmers and wider distribution of products.

The potash industry, too, has grown rapidly based upon large demand for its products, improved technology in mining and refining operations and the discovery of new deposits of potash within the continent. Ownership of primary production is becoming more widespread.

Along with the increasing growth and changes in the various portions of the over-all fertilizer industry there have been even greater changes in patterns of use of fertilizers. The traditional fertilizer using areas of the Atlantic seacoast and the Southeast no longer use the bulk of all fertilizer materials. The Midwest has become a big factor, with the West making significant strides.

More farmers throughout the Nation are fertilizing more crops with a strong trend toward use of fertilizers on crops other than the high-value, price-supported row crops. Yet there remain large acreages which are not fertilized and most of those acres that are fertilized, on the average, are using very small amounts per acre in comparison with college recommendations.

Along with the increases in tonnages used by various sections of the country there is a change in the geographic pattern of use. The average analysis of straight materials and that of all mixed fertilizers has increased rapidly as a result of the introduction of newer, higher analyses—more economically priced fertilizer materials such as ammonium nitrate and concentrated superphosphate.

The use of these new types of fertilizer materials has generally led to many new techniques of spreading fertilizers on the farm—straight materials versus mixed goods versus bulk-blending; using fertilizer as side dressing, or use of liquid fertilizers, or others. In order to lower the cost to the farmer of fertilizer spread on the land many new methods of applying fertilizer are being tried such as bulk-blending, three-hopper spreader, bulk spreading by truck, and spreading liquid materials and liquid mixed fertilizers. In short, almost every phase of the fertilizer industry has changed and is changing. New materials are being produced for new uses in new areas.

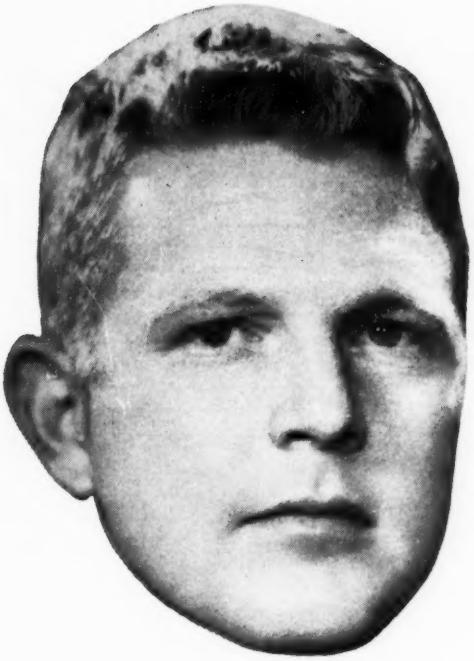
These changes in the fertilizer industry have created a need for more research into the problems of production and distribution than perhaps the industry has known prior to this time. And with the changes in production and distribution and changes in types of materials available to the farmer for his use, there has developed a growing need for research into educational methods and procedures which can best be used to disseminate the advances in technological and agronomic knowledge to farmers.

I will not attempt to go into the acute needs for technological research from the point of view of the prime manufacturer of raw materials nor from the point of view of laboratory experiments . . .

One phase of research which is of great use to our distributor demonstration program is that of the agronomic-economic approach to the use of fertilizers. Our field representatives find it much easier to explain the benefits of a demonstrational program in terms of economic returns than to do so simply and purely in terms of agronomic increases. Many have aided in pioneering in this type approach and are continuing to expand its methodology and application procedures. We can only say that much more work remains to be accomplished in this field; and with the changes in the fertilizer industry coming as rapidly as they are it is even more imperative that emphasis on this phase of research continue at a high level.

There are three other general phases of research, however, in which very little has been completed —and in some cases not too much work has been initiated. These three general areas as I see them are: (1)

THE MAN WITH THE ★ MULTIWALL PLAN



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PACKAGING SPECIALIST
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helps Multiwall user reduce bag costs $4.05 per M

In Multiwall packaging, paradoxically, it's sometimes necessary to add in order to reduce. Take the case of one leading company whose bag designs recently were analyzed by Union Packaging Specialist Gene Cartledge.

The firm uses Sewn Open Mouth Multiwalls in part of its operation. Cartledge recommended adding Union's special SEW STRONG construction (reinforcing strips at top and bottom of bag). The stronger closure enabled the basis weight of each bag to be reduced by 10#. The new sewing method led to a reduction in bag length, an improved bag design—and $4.05 per M savings! Another recommendation: convert all the firm's present Sewn Valve Multiwalls to Sewn Open Mouth types. This complete changeover will further streamline bagging and, based on the company's annual requirements, result in thousands of dollars in additional savings.

Union Multiwall Recommendations are based on this 5-Star Packaging Efficiency Plan

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UNION'S PACKAGE ENGINEERING DEPARTMENT will study your Multiwall bagging methods and equipment and make appropriate recommendations, regardless of the brand of Multiwalls you are now using.

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research in the economic production of mixed fertilizers at local mixing plants, blending plants, and liquid plants; (2) research needed on the distribution channels and practices which are being used and which should be used to promote efficiency and economy, including the phase of physical transportation of fertilizer materials from the point of prime manufacture to farmers; and (3) needs for research on educational methods and procedures to be used to best disseminate technological and agronomic knowledge to the users of these new fertilizer materials.

Needs for Research on Production of Mixed Fertilizer

Bulk Blending

With the increasing practice of bulk blending of straight fertilizer materials and application of these bulk blended materials directly to the farm by the bulk blender or contract hauler, it has become important that the economics of operation of such plants and the economic and agronomic feasibility of such a type application should be thoroughly studied. There have been some studies of bulk blending, such as the recent ones in Illinois, which have given the fertilizer industry a basic background of knowledge upon which to build.

It is quite possible that further studies along this line would reveal additional economies in manufacturing or distribution which might be effected both from the point of view of the manufacturer and from the point of view of the farmer. In line with bulk blending, some solution is needed to the question of "how can fertilizer control officials of any state assure themselves that the fertilizers so produced will be maintained at a constant grade and that the farmer obtains the plant nutrients which he pays for under this practice?"

From an agronomic-economic point of view more research is needed to determine the agronomic-economic effects of partially uneven distribution of various fertilizer components resulting from segregation of materials in the bulk blending and spreading process.

Liquid Plants

For some years now the practice of using liquid fertilizers, both straight and mixed, has been growing rapidly especially in the West Coast area of the United States. For the past four or five years the use of straight liquid materials has been growing in the Middle West and to a lesser extent in the traditional fertilizer using area of the Atlantic seacoast and Southeast. The use of liquid fertilizers appears to offer economies to the farmers especially in the use of liquid nitrogen and with the increase in production of phosphoric acid perhaps economies can be made in complete mixtures of liquid materials. This method of applying fertilizer has appealed to farmers in that it has eliminated many of the more arduous tasks involved in handling fertilizers. Instead of lifting bags of material, he uses a pump to lift the liquid into his distributor and he purchases the liquid in many cases with the provision that the seller apply it to the crop.

There are major areas, however, in this type fertilizer distribution for which there is little basic background of knowledge of the economics of the technology. One problem is "what is the most efficient and economical size of plant which should be constructed by producers of liquid fertilizers, what should be its location with respect to markets and sources of materials, will the economics of this type of production and distribution of fertilizers be such as to lead to large concentrated plants for production of liquid mixed materials, or should the plant size be small and located immediately adjacent to the market area?" At the present time, indications are that probably the latter is true; however, no complete research project has been undertaken to our knowledge, to analyze these problems.

Will custom handling of liquid fertilizers meet the farmers demands or must farmers install storage facilities of their own and purchase distribution equipment? The answers to these questions will depend to some extent at least upon the answers upon economical size of plant.

Another problem facing the liquid mixed fertilizer producers involves the alternate use of base solutions such as 8-24-0 or the newer, improved 11-33-0 solution currently being produced by TVA versus the ammoniation of phosphoric acid by the producer of liquid mixed materials at his plant. Isolated studies have been made but for the most part even these studies have been made in relation to the already existing plant not prior to the construction of the plant.

Lowest Cost Analyses of Ratio at Given Point

With the introduction of the new dual element chemical compounds such as diammonium phosphate (21-53-0) and ammonium phosphate nitrate (30-10-0) it has become increasingly difficult to determine what is the lowest cost, highest analysis mixture of any ratio which may be produced and distributed to farmers. As long as the producers of prime fertilizer materials were producing generally only one-element materials such as ammonium sulfate, ordinary superphosphate, concentrated superphosphate, et cetera, it was relatively easy for the mixer of fertilizers to determine what type prime material to use for any given analysis of any given ratio of plant nutrients. With dual element materials, however, the problem of placing a relative value on the two nutrients is much more difficult. The development of linear programming techniques promise to enable us to overcome this problem and by the application of these mathematical methods to effect economies to the manufacturers, to the farmers, and to the Nation.

Lowest Cost Mixtures of a Given Analysis

This problem, in effect, is the same general problem as that discussed above. In many cases we have found by experimentation with the linear programming technique that savings may be effected in the cost of ingredients of a given analysis of mixed fertilizers by using small amounts of high cost, very high analysis dual element materials and thus enabling the manufacturer to use larger amounts of lower cost, low analysis materials, the combination of which results in a lower cost of final product than if a medium cost, medium analysis straight raw material had been used. We at TVA have done some work along this line and at the present time additional research efforts are being expended by one or two colleges; I do not believe, however, that the surface has been scratched in this particular area of application of mathematical methods to the problems of fertilizer mixers.

Problems of Small Fertilizer Mixing Plants

With the coming of large-scale, vertically integrated producers of raw materials and of mixed fertilizers, the small producers of mixed fertilizers are apparently being placed at a competitive disadvantage, particularly in the Southeast.

Sohigro® UREA gives fertilizer sales a real growth boost

INDUSTRY figures for the 12 North Central States show a 30% boost in the use of nitrogen in fertilizer materials with an increase in higher nitrogen complete fertilizers — 1-1-1, 2-1-1 and even 3-1-1 ratios — during the past year. But if mixed fertilizers don't supply all the nitrogen your customers need, meet the demand by stocking Sohigro Urea. Sohigro Urea supplements mixed fertilizer sales with profits from plow down, top dress, or side-dress sales.

Sohigro Urea gives you more selling advantages than any other nitrogen fertilizer. Prilled, free-flowing Sohigro is non-caking . . . easy to apply. Important, too, Sohigro delivers more nitrogen grow-power (45% actual nitrogen) than any other solid nitrogen fertilizer. Sohigro Urea is all-ammonia nitrogen . . . fast-acting, yet long-lasting.

Cash in on the trend to increased use of high-nitrogen materials by stocking Sohigro Urea now. Call the "Man from Sohio" for details on fast, efficient delivery by rail or truck, or plant pickup at Lima. Inquire also about the savings by handling Sohigro Urea in bulk, especially for custom application.

See Sohio first for high-quality 45% or uncoated 46% urea — anhydrous ammonia — aqua ammonia — 18 nitrogen solutions, including all urea types.

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To compound their difficulties, many of their plants are, by current standards, obsolete and almost, if not wholly, depreciated.

If these small producers of mixed fertilizers are to remain as a competitive force and to continue offering the services to farmers which they have in the past, there must be a large amount of research into the optimum type and size of equipment and the types of fertilizer manufacturing processes and programs which they should undertake as a replacement for their current business operations. This is an area of great need for research efforts by colleges as well as industry.

Needs for Research on Distribution Channels and Practices

Survey of Trends in Type of Channel

At one time the type of distribution channel followed in the fertilizer industry was generally well-defined. With the coming, however, of new producers of prime materials and with the coming of new types of fertilizers, the types of distribution channels followed this change and are changing overnight. With some fertilizer materials the typical distribution channel is that of prime manufacturer to wholesaler to retailer to farmer.

This type channel, however, may be changed and in some cases is being changed to exclude either the wholesaler or the retailer or both. By excluding certain portions of the general pattern perhaps some temporary savings in dollars are accomplished but at the cost of a lessening of educational efforts and of physical services rendered to farmer-purchasers of the materials.

No general survey, to our knowledge, has been made of the various type channels which are developing and of the total results in terms of dollars saved or services rendered to the ultimate purchaser. It might be well worthwhile to have a general over-all survey of this problem in order to realize the net end result over a long period of time rather than to work out the immediate savings in terms of dollars and cents per ton on a short run basis as it appears that some of the fertilizer industry is doing today. Price cutting instead of education has, in some cases at least, reduced the prestige of fertilizer dealers with farmers. Would some form of a soil service center help restore the prestige of the dealers by improving the educational programs?

Optimum Distribution Area

With the various technological advances, with the introduction of new type fertilizer dealers such as the bulk blender, liquid manufacturers, etc., there has developed a need for study of the optimum size distribution area which should be used by any one specific type outlet or sales agency. Should the bulk blending outlets attempt to cover a radius of 25 miles, 50 miles, or more? Can they offer the various services and educational activities which are desirable if they are to remain in business and to perform their full functions for all their customers over a long period of time? We do not know the answers to this problem nor, to our knowledge, has any such research project been initiated on any broad scale.

Should Separate Services Be Separate Enterprises?

One question which has arisen with the beginning of services such as bulk blending and/or preparation of liquid mixed fertilizers is whether these services should be separate, complete enterprises, or whether they should be entered into as merely complementary enterprises to that of an already existing fertilizer manufacturer or distributor. With the already existing fertilizer dealers usually the fertilizer enterprise itself is supplemented by other lines of business such as seed, feed, oil, hardware, and other farm supplies. This enables the fertilizer dealer to remain in business the entire year and by so doing to offer to his farmer-customers a year around fertilizer service.

In the case of a bulk blending unit or a liquid fertilizer unit as a separate enterprise, it is almost certain that such an organization cannot afford to remain in business except for those few months of the peak fertilizer season. Thus, their customers have only a short period in which they can obtain services and the fertilizer information which they desire. Since the capital required to enter either the bulk blending or liquid fertilizer service is relatively small, however, it may develop that local entrepreneurs will enter on this short time basis and attempt to compete with existing old-line established fertilizer dealers—perhaps successfully, at least on a short run basis. Such a trend could easily cause extreme consternation in the fertilizer industry as a whole and perhaps would damage the reputation of all fertilizer dealers. To our knowledge, no research project as such has been undertaken to study this problem.

Distribution Costs

At one time TVA made rather extensive studies on the various distribution costs involved in distributing fertilizers from the point of prime manufacture to the farmer. This was in the late 40's, however, and since then the type of distribution channel has changed considerably as pointed out above. In addition, the services offered by these various distribution channels have changed. Along with the changes in type distribution channel and services offered, a random gathering of the statistical figures relating to margins taken by various segments of the distribution channel indicate that these margins taken are also changed. It is quite possible that a research project to investigate the distribution costs involved in relation to the services rendered might well point to savings which might be effected for the farmer—the ultimate user of the fertilizer materials.

An additional study which might be made in the field of distribution costs are studies of possible ways of lowering the costs of transportation of fertilizers from prime manufacturer to the farmer. This becomes especially important with continuously increasing rail rates and with increasing barge transportation becoming available. There are problems connected with barge transportation for which apparently there are no good solutions. For instance, barge transportation of liquid fertilizers appears to be out of the question since most liquid mixers are very small and have limited storage capacities whereas barge transportation, if it is to be economical, involves moving amounts of fertilizers of not less than 1,200 tons for one barge load. Savings on some of the materials might involve as much as $8 to $10 per ton if some compromise solution can be found and liquid fertilizers moved by barges rather than by the more expensive rail and truck transportation which is currently used.

At the present time with the great number of manufacturers of prime materials who are producing almost identical products there is a tendency to increase the amounts of total cross-haul of these materials. This cross hauling tends to increase the price of the material to the farmers since the costs of transportation are passed on to the ultimate user—farmers. If some research could be completed pointing out actual costs involved and possibilities of reducing

Arcadian® News

Volume 4 | For Manufacturers of Mixed Fertilizers | Number 4

Are You Taking Full Advantage of Nitrogen Division Service?

During your rush season and in any season, Nitrogen Division, Allied Chemical, is better equipped than any other nitrogen producer *to serve you.* Here are three important reasons why—

1 Technical Assistance

To provide its customers with competent, well-qualified technical assistance, Nitrogen Division maintains the largest, best-trained, most-experienced staff of fertilizer technologists in the industry. This staff includes hundreds of fertilizer technicians, scientists and engineers working with millions of dollars worth of laboratory and pilot plant equipment.

These men are ready, willing and able to help you find the practical answer to your formulation, ammoniation and manufacturing problems. The accumulated skill of many years of experience augments your own efforts. And this service is available to customers without charge.

Nitrogen Division technical men work on your problem in your plant or in their laboratories using the most modern facilities. They are skilled in ferreting out trouble spots and in helping you to quickly correct operating techniques.

Remember, Nitrogen Division technologists originated and developed nitrogen solutions and the practice of ammoniating superphosphate. They have the *know-how* that counts when you need help fast!

2 Production Capacity

Long-time leading producer of fertilizer nitrogen, Nitrogen Division owns and operates three huge plants—at Hopewell, Virginia; South Point, Ohio; and Omaha, Nebraska—by far the biggest nitrogen production capacity in the country. And, Nitrogen Division offers the most complete line of nitrogen products available to the fertilizer manufacturer.

Look over the list of ARCADIAN® Nitrogen Solutions and other ARCADIAN Nitrogen Products on page 4 of this issue of ARCADIAN NEWS. No other nitrogen producer is so well prepared to supply your complete nitrogen needs. You can get the exact nitrogen products you want from Nitrogen Division—and *all* your nitrogen from one source.

3 Delivery Facilities

Getting your order to you on time for you to meet production schedules is standard procedure for Nitrogen Division. Its three plants are strategically located for fast shipment to fertilizer manufacturers, with the aid of the largest fleet of tank cars in the industry plus many tank trucks. A widespread network of "in-transit" storage points is maintained, where fully-loaded tank cars sit on railroad sidings ready to move immediately for fast deliveries.

All Nitrogen Division facilities are closely linked by teletype, direct private phone and other methods of rapid communication. Every provision is made to expedite your orders—to get your nitrogen rolling to you immediately.

Nitrogen Division has the products and the people to serve you best! Why not see how well this service operates? Contact: Nitrogen Division, Allied Chemical, 40 Rector Street, New York 6, N. Y. Phone: Hanover 2-7300. Or call one of the 12 other offices listed on page 4 of this issue of ARCADIAN NEWS.

Arcadian News for Fertilizer Manufacturers . . . . . from NITROGEN DIVISION

Grazing and Silage Crops Thrive on 2-1-1 Ratios

Don't let the outstanding success of 2-1-1 ratio fertilizers for corn blind you to the late spring opportunities for extra sales on *other* grass crops. Yes, corn is a specialized kind of grass. Other grass crops are like it in needing high-nitrogen mixed fertilizers to produce big, profitable yields.

When you provide your dealers with 16-8-8, 14-7-7 and other top-notch corn fertilizers, advise them to top off the corn season with the grass market. Sure, early spring is the time many pastures are fertilized. But they need nitrogen and other plant food again after the first flush of growth has been grazed or cut.

When high-nitrogen fertilizer can make grass produce 6 to 8 tons of milk per acre, and 400 to 800 pounds of beef per acre, there's money in fertilizing the crop. It will pay to get your share of it. Remember, most farmers get less than a ton of milk per acre of ordinary pasture, and 75 to 150 pounds of beef per acre of ordinary grass.

Grass pastures and hayfields produce the best tonnage of protein-rich feed when they get several applications of fertilizer per year. Instead of a heavy dose of 0-20-20 followed by 2 or 3 nitrogen top-dressing applications, farmers can use a 2-1-1 ratio mixed fertilizer three times a year. May and early June, after the first crop is off, is a fine time to get mixed fertilizer on grassland. Demonstration strips fertilized with 16-8-8 or similar fertilizer will open the eyes of many a farmer to his need for grassland fertilizer.

Summer grazing crops, like sudan grass and millet, yield tons of good feed per acre when they get fertilizer. Your 2-1-1 mixed fertilizers are ideal to make these warm-weather crops get up and grow.

PROPOSED CHANGES IN FERTILIZER GUARANTEE LAWS

Bills have been introduced in the State Legislatures in Maine and Minnesota, which, if approved, would require that the phosphorus and potash content of fertilizer be guaranteed on an elemental rather than the present oxide basis. Plans to introduce similar bills this year are reported to be under way in several other states. Preliminary hearings have already been held on the proposed changes by the Maine and Minnesota legislatures. Little, if any, publicity has been given to this activity in trade papers and it is reported that few fertilizer manufacturers had representatives present at preliminary hearings.

It behooves all fertilizer manufacturers to follow this development closely. If you market within a state in which elemental guarantees have been or will be proposed, you will want to evaluate the effects of such changes on your business and keep State Legislatures and trade associations advised of your position.

Technical Tips

QUALITY CONTROL

In the early years of the fertilizer industry, the producer got just as much quality out of his production as he put into it. In fact, the long "curing" process that was the custom, then, often *improved* the product.

But this is no longer true. Today, the use of new and more concentrated ingredients to make higher analysis fertilizers *plus* the emphasis on speed to fill volume orders, has made quality more elusive. If equipment and techniques are not carefully watched and maintained for peak performance, finished goods will not contain *all* the nitrogen that is put into the mix. The producer should not delude himself into thinking that the mere adding of costly, complicated equipment and certain new materials will solve his quality problem. It may, if he's not careful about operation, simply create new and more serious difficulties.

Common Errors in Technique

One of the traps that the unwary producer may fall into is the striving for low moisture content of granulated fertilizer by permitting excessive heat in the storage pile. This can result in "bag set" —the very thing the producer is trying to avoid through low moisture content. In addition, if carried to extremes, this preoccupation with minimum moisture can cause release of undesirable fumes from the dryer, with some loss of nitrogen.

Another common fault is to attempt to save time by speeding up the ammoniation process. The problem is that in high rates of ammoniation, the heat of the mass causes the last portion of nitrogen solution being introduced to give up its ammonia in the form of gas. For obvious reasons, this is the part of the action that cannot be hurried in any system, and still maintain adequate control. Unfortunately, this time period is the most obvious to producers, and the one they usually try to shorten to speed up mixing time. They would be better advised to save time by adding the *first* portion of the ammoniating medium more rapidly. This can be done in most systems, including continuous types.

Still another error is to try to save time by not using the holding hopper ahead

of the batch mixer. This can only lead to robbing essential operations of vital time allotments.

Some producers actually go so far as to remove screens to speed up production. As a result, the lumps of ingredients deprive the process of the intimate contact on which so much depends. Where the lumps are superphosphate, the effect on ammonia take-up, as well as on physical quality, is well-known. Even with screening, an unreasonably fast operation with very lumpy materials can cause irregular concentration in the mass. What happens is that too long a holdup at the sizing mill prevents some of the materials from returning to the batch in time.

Let Sampling Help, Not Hinder

If the physical mixing and chemical combining of mixed fertilizer were 100% efficient, then undisciplined (easy-way) sampling would be acceptable. But the pressure for tonnage alone is such that perfection in these two areas is not compatible with the other economics of the fertilizer business. Thus, as operations depart further from perfection, the operator is forced to rely more and more on sampling as a check on his production. It goes without saying that the producer should make every effort to sample *correctly*.

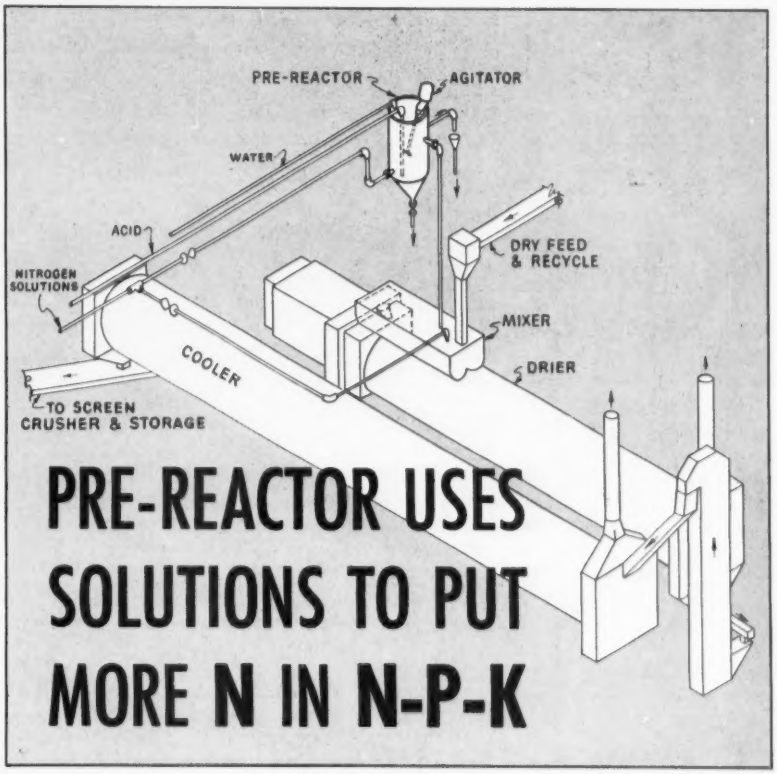
For example, when sampling every batch, the producer should be careful not to take samples from the same region of the discharge every time. Obviously, the analysis of this total sample indicates only the amount of plant foods in that particular portion of the batch, which may or may not be representative of the entire mass.

Again, taking several samples during the discharge of a single batch is almost as bad a practice. Here, the total sample usually contains an unduly large proportion from the slow discharge rate part of the cycle. So, take your samples properly, and they will give you a true picture of what you are producing.

Weather Forecasts

Nitrogen Division has begun distribution of monthly weather forecasts to its customers all over the country. The forecast for each month will be mailed about a week before the month begins. Weather is one of the most important factors in the fertilizer business and the new service should be helpful in making plans.

The forecasts, said to be 80% accurate, are prepared for Nitrogen Division by Weather Trends, Inc., one of the oldest private weather forecasting services in the nation. In addition to a summary giving over-all weather predictions, each forecast will include colored charts and maps showing expected precipitation and temperatures in each section.



Typical high-analysis fertilizer operation with pre-reactor.

Until recently, getting maximum use out of nitrogen solutions in making high-analysis fertilizer has been limited by the amount of acid that could be added to the mix without developing excessive heat in the liquid phase. But now, with the new technique of using a *pre-reactor*, every producer can formulate 2-1-1, 3-2-2 and other high ratios with safety and precision.

No Acid in the Mix

This new technique involves keeping all acid out of the mix—confining it to the pre-reactor, along with the nitrogen solution. Here, the acid neutralizes the free ammonia in the nitrogen solution. The heat generated by this reaction is dissipated through evaporation of water by the pre-reactor. In some formulations this function of "drying out" in the pre-reactor assumes even greater importance.

Makes Production More Precise

The pre-reactor has further value in that it gives the producer greater control over heat and water content in the mix. By adding water to the pre-reactor at an easily determined rate, he can maintain a constant temperature that provides a slurry of uniform nitrogen and water content to feed the mixer. In effect, by using a pre-reactor, the producer can efficiently neutralize all the ammonia in excess of that which is necessary for ammoniation of the superphosphate. In view of this, it is obvious that the new pre-reactor technique will prove to be a most valuable aid in the producer's never-ending fight to maintain quality in volume production.

Cuts Costs, Increases Profits

In addition to the foregoing benefits in safety, precision and greater control, the use of a pre-reactor gives the producer a unique economic advantage. For, getting all his nitrogen from low-cost Arcadian Nitrogen Solutions can add a big plus to net profits. As the sketch shows, there is nothing complicated about incorporating a pre-reactor in a normal high-analysis granulation operation. The same standard equipment is used . . . nothing is eliminated. Take advantage of the new pre-reactor technique for making high-analysis fertilizers . . . you'll *like* the difference in your volume, quality and profits! For complete details—without obligation—on how to put a pre-reactor into your present granulation setup, write: Technical Service, Nitrogen Division, Allied Chemical Corporation, 40 Rector Street, New York 6, N. Y.

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	CHEMICAL COMPOSITION %						PHYSICAL PROPERTIES		
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®									
2	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	10.8	1.147	18	15
3	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	8.9	1.184	1	56
4M	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	13.9	1.050	48	-52
7	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
URANA®									
6C	43.0	20.0	68.0	6.0	6.0	9.3	1.180	12	39
6M	44.0	22.0	66.0	6.0	6.0	10.0	1.158	17	14
10	44.4	24.5	56.0	10.0	9.5	11.0	1.114	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.087	25	- 7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
15	44.0	28.0	40.0	15.0	17.0	12.7	1.052	29	1
U-A-S®									
A	45.4	36.8	—	32.5	30.7	16.2	0.932	57	16
B	45.3	30.6	—	43.1	26.3	13.5	0.978	48	46
Anhydrous Ammonia	82.2	99.9	—	—	—	24.3	0.618	211	-108

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these costs by cross-trading of products, considerable reductions in price of fertilizers to farmers might be made.

Needs for Research on Educational Methods, Practices and Procedures

Fertilizer Demand Studies

With the increase in fertilizer use there has been and continues to be increased interest in the factors that influence farmers' use of fertilizer. Some studies have found that fertilizer use was closely related to farm income in the period prior to 1948. Since then, however, other factors appear to be correlated more closely with fertilizer use than the one factor of farm income.

Some recent studies have attempted to determine more adequately what are the factors which lead to farmers decisions to buy or not to buy fertilizers. Further work along this line is needed to pinpoint these factors which might affect fertilizer use so as to be able to determine upon what specific factor in any general area emphasis should be placed in order to encourage maximum adoption of new fertilizer practices and/or new fertilizers. What educational methods will be most useful in changing a farmer's attitude and buying habits?

What Agencies Can Effect Educational Programs?

Much research has been accomplished by members of Iowa State College and other colleges in relation to what agencies would be most important in changing or forming a farmer's attitude toward use of fertilizer and other productive factors. Much additional work is needed along this line. It is clear that the college extension services have played a great part in farmers decisions on fertilizer use. It is further clear from most of these studies that the fertilizer dealer can accomplish much toward attitude of his customers through the proper use of proper amounts of fertilizers. Study is especially needed in this relationship as to how to increase the effectiveness of the dealer in this role as an educational "institution."

What Demonstrations Are Most Effective?

Fertilizer demonstrations over the past years have progressed from the small plot test to the larger plot tests then next to whole field demonstrations, and of recent years to whole farm planning demonstrations. At one time in TVA the test-demonstration program incorporated what was known as a community demonstration area. Recently it has been proposed that this idea of putting on a community-wide demonstration for a short period of time might be the best thing in the long run, and the least expensive form of demonstration to be used in encouraging the introduction of a new fertilizer or a new fertilizer practice. Frankly, we do not know the answer to what is the least expensive and most effective type of fertilizer demonstration. At the present time all of the various types of demonstrations are being carried on with a varying degree of success throughout the country. We believe that additional research efforts could well be expended for scientific study of which type demonstration is most profitable, most effective, and least expensive.

Educational Program Costs

When fertilizer dealers undertake to carry on an educational program over and above the normal sales program, they, of necessity, incur some additional costs — how much no one knows. These costs will vary, of course, with the intensity of the educational program and to some degree with the type approach used. If by some means an effective educational program could be synthesized—a synthetic mock construction — this approach might be used in determining how much a program would cost, how much fertilizer would be required in order to carry on this educational program at an effective level, and for how long. Some thought might be given to the thesis which has been advanced that any such educational approach would pay for itself by the immediate and long run increase in total volume of sales of all fertilizers over and above what it would have been without such a program. There are indications from some recent studies that this is generally, if not always, the case.

GRANTS

$9000

Potato growers everywhere who have fought black spot in their crops will follow with interest a project recently launched by University of California scientists to determine what role potash hunger plays in this quality-reducing problem.

The three-year project is being aided by a $9,000 grant from the American Potash Institute.

$2000

A research project to determine the factor next limiting the production of corn, soybeans, and cotton will be initiated this spring by the **South Carolina Agricultural Experiment Station,** according to **Dr. O. B. Garrison,** director. The project will be supported, in part, by a grant of $2,000 from the **National Plant Food Institute,** said S. L. Tisdale, Southeastern Regional Director for NPFI.

$2000

"The adequate use of lime and fertilizer combined with other good management practices has increased yields, lowered unit costs of production, and increased net income from the production of cotton, corn, and Coastal Bermudagrass," says W. H. Sell, Extension Agronomist with the Georgia Agricultural Extension Service.

This statement was based on the results of a number of demonstrations conducted during the past year throughout the state.

The corn and Coastal Bermudagrass demonstrations were supported, in part, by a $2,000 grant from the National Plant Food Institute.

HONORS

Two of Colorado's top sugar beet and corn producers were honored at the National Farm and Ranch Congress meeting in Denver. Secretary of Interior Fred A. Seaton presented certificates to the farmers who were singled out as new members of the 200 Bushel Corn Club and the 10,000 Pound Sugar Club. National Plant Food Institute was co-sponsor of the award;

* * *

Recognition was given to eleven outstanding Colorado farmers at the National Farm and Ranch Congress banquet in Denver last month. **Dr. Richard B. Bahme,** Western Regional Director of the **National Plant Food Institute,** announces "Of the eleven men, seven will be honored for exceeding 200 bushels of corn to the acre," Dr. Bahme said. "The other four achieved membership in the 10,000 Pound Sugar Beet Club for impressive sugar beet production records."

PEOPLE in the Industry

V-C

Charles T. Harding and **Douglas W. Laird** have been elected vice presidents of **Virginia-Carolina Chemical Corporation.** Mr. Harding will serve as vice president in charge of fertilizer manufacturing and Mr. Laird will be in charge of purchasing. Mr. Harding began his V-C career in 1918.

Mr. Laird is a second generation V-C employee joining V-C in 1948. His father, the late **Howard N. Laird** was northern sales manager for the fertilizer division, his mother worked in the tax department and his uncle, the late **C. F. Sims,** was sales manager at Carteret.

National Potash

National Potash Company has announced promotion of **R. J. Ferranti** to refinery superintendent and of **Lloyd W. Weems** to succeed Mr. Ferranti as refinery shift foreman, according to **T. G. Ferguson,** general manager.

Smith-Douglass

R. H. Farmer, vice-president and general manager of Texas City Chemicals, Inc., a wholly-owned subsidiary of **Smith-Douglass Co.,** Inc., has been selected general manager of production for the company's chemical division with headquarters in Norfolk, Va., effective March 1. He will be replaced as general mgr. of **Texas City Chemicals** by **Herman G. Powers,** presently assistant fertilizer division production manager.

Effective August 1, **Waldo R. Mowen,** office manager and secretary of the **Coronet Phosphate Division** in Plant City, Fla., will become assistant to Smith-Douglass secretary **W. Farley Powers,** holding responsibility for credit extensions and collections, with headquarters in Norfolk. Smith-Douglass operations vice-president, **J. A. Monroe,** made the announcement.

Farmer **Mowen** **Powers**

Pacific Guano

D. S. "Don" Catterson has been made assistant to the general manager of Pacific Guano. Previously he was six years with **Westvaco.**

US Steel

Loren R. Johnson, formerly with **Spencer,** has been named to the **U.S. Steel** market development team.

Meyer

John C. Flemer has become advertising manager of **Wilson & Geo. Meyer & Co.** He was formerly with **National Lead.**

Nitrogen Division

Maury W. White has been named an agricultural sales representative for Florida by **Nitrogen Division, Allied Chemical Corporation.**

White

Mr. White joined Nitrogen Division last July and until his recent appointment was a sales trainee at the Division's Hopewell, Virginia office.

Graduating from Virginia Polytechnic Institute in 1958, he holds a B.S. degree in agricultural economics. While at V.P.I., he worked summers for the Virginia Agricultural Experiment Station interviewing farmers in connection with various experiments.

Farmers Fertilizer

B. P. Redman Jr. was elected president of **The Farmers Fertilizer Co.** of Columbus, Ohio at a recent meeting of the firm's Board of Directors. At the same time the company announced the retirement of **H. E. Wood,** vice president.

H. J. Thomas was named secretary and **M. Y. Cooper, II,** was named treasurer.

Wood will officially retire from his post with the company July 1. He has been with the firm more than 40 years, beginning in 1918 as a factory clerk.

Corgill

Rea

Bradley & Baker

Bradley & Baker announces that **James E. Corgill** and **H. Parker Rea,** have joined the staff of its Atlanta sales office and will serve as sales representatives.

Mr. Corgill will cover the northern half of Alabama and Mississippi, and all of Tennessee. Mr. Rea will serve southern Alabama and Mississippi, and counties in western Florida and southern Louisiana.

Two other sales representatives of Bradley & Baker's Atlanta office have recently changed residence. **H. Carl Wiggins,** whose territory includes western and southern South Carolina, is now living in Columbia, South Carolina. **Thomas L. Perkins,** who covers southern Georgia, has moved to Macon, Georgia.

Bradley & Baker, sales representatives for fertilizer materials, feedstuffs and chemicals, also maintains offices in Jacksonville, Florida; Baltimore, Maryland; St. Louis, Missouri and Norfolk, Virginia.

Texas Gulf Sulphur

Fred M. Nelson, chairman of the board and chief executive officer of **Texas Gulf Sulphur,** will head a chemical industry committee for fund-raising on behalf of the largest campaign of citizen education in foreign policy ever undertaken by private auspices in this country. The nonpartisan **Foreign Policy Association** is marking its 40th anniversary with its first national appeal for funds.

H. S. Caven and **A. N. Myers** have been elected vice presidents of **Texas Gulf Sulphur Co.,** according to a recent announcement by **Fred M. Nelson,** chairman of the Board.

Chase

James F. Porter has been named chief engineer for the **Chase Bag Company,** it was announced in New York by **F. H. Ludington, Jr.,** vice president. Mr. Porter has been manager of the firm's manufacturing plant in Toledo, Ohio; he will be succeeded in that position by **James E. Town, Jr.,** it was announced.

Davison Chemical

Appointment of controllers for its three operating units, with full responsibility for financial and accounting activities, has been announced by **W. R. Grace & Co., Davison Chemical Division.**

John L. Dowell was named controller, Chemicals Division; **A. H. Hanssen, Jr.,** controller, Mixed Fertilizer Division and **Edgar L. Linthicum, Jr.,** controller, Agricultural Chemicals Division.

Spencer

Spencer Chemical Company has announced the addition of a sales representative for a western territory. The new representative will be **E. J. "Ed" McMillan,** who will serve an area comprised of Colorado, New Mexico, and West Texas.

McMillan

Mr. McMillan has been employed by Spencer in production and administrative positions at the company's Jayhawk Works since 1942.

Spencer has shifted two members of its agricultural chemicals division, **Proctor Gull** and **R. L. Balser,** to new positions.

Mr. Gull has moved to the company's research and development division to become manager of new agricultural product development.

Mr. Balser has become manager of sales promotion, agricultural chemicals.

Quebec Fertilizers

The appointment of **Louis-Philipe Thibodeau** as manager of **Quebec Fertilizers Inc.,** is announced by **Paul Bastien,** president of the organization.

Thibodeau

Quebec Fertilizers Inc. is an organization devoted to the promotion of increased farm production in the province through the scientific use of plant food. It already has launched a widespread demonstration program in various sections of Quebec in co-operation with agricultural colleges and the federal and provincial departments of agriculture, working closely with local county agronomists.

Gorman

Schafer

American Cyanamid

C. Paul Schafer has been named to succeed **James Gorman,** who retired end of last month after 32 years with **American Cyanamid.**

James Gorman, manager of nitrogen products for **American Cyanamid Company's Agricultural Division** since 1944, retired March 31 after 32 years with the company. Mr. Gorman joined Cyanamid in 1927 as a field representative and in 1932 was appointed district sales supervisor for the Middle Atlantic States. He was transferred to the Company's main offices in New York in 1939, when he was named assistant sales manager.

CFA

The Soil Improvement Committee of the **California Fertilizer Association** has announced with regret the resignation of its agronomist, **Malcolm F. Rice,** as of March 1, 1959.

Mr. Rice took his degree from the University of California, and has been associated with the Committee since November 15, 1957.

He is leaving to go into active farm management in the Imperial Valley. His many friends in official agriculture and in the fertilizer industry wish him well in this new venture.

Texaco

Rudolph C. Creasy has been appointed **Texaco's** petrochemical sales representative to fertilizer manufacturers and other users of ammonia and nitrogen solutions in Missouri, Kansas, and Arkansas.

His headquarters are at the company's Central Region sales office in the McCormick Building, Chicago.

AGRICO ANNOUNCES CHANGES

Continuing the reorganization brought about by AGRICO's recent expansion and acquisitions, The American Agricultural Chemical Company announces the following personnel changes:

W. H. Phillips becomes branch manager at East St. Louis, Ill. He replaces **J. W. Engle,** who is now manager of Agrico's Western Sales Division, with headquarters at St. Louis.

D. J. Boyer becomes branch manager at Buffalo, N. Y. He replaces **C. R. Clemons,** who is now manager of Agrico's Mid-Southern Sales Division, with headquarters in Greensboro, N. C.

D. L. LeCureux becomes branch manager at Saginaw, Mich., replacing **W. L. Beales** who is now manager of Agrico's Northeast Sales Division, with headquarters in New York.

T. S. Bryars becomes assistant branch manager at Montgomery, Ala. He was formerly a salesman at Pensacola, Fla.

J. W. Grooms becomes assistant branch manager at Nashville, Tenn. He formerly filled a similar capacity at Greensboro, N. C.

J. H. Dorsey has been named assistant branch manager at Agrico's Cairo, Ohio, plant, according to an announcement by W. J. Turberville, Jr., vice president in charge of fertilizer sales. Cairo manager is **R. P. Cagley.**

Edgar B. Stalnaker becomes branch manager at Three Rivers, N. Y. He was formerly assistant manager at Carteret, N. J.

Dr. Donald P. Satchell has joined the service division staff of **The American Agricultural Chemical Company,** Mr. Turbeville has announced. His headquarters will be in New York City.

M. B. Steele has been made assistant superintendent at the Washington C. H., Ohio, plant, working with **A. F. Vetter.**

Phillips Boyer LeCureux
Bryars Grooms Dorsey

Monsanto

J. Ralph Alexander, St. Louis, has been appointed a senior technologist with **Monsanto's** Inorganic Chemicals division at St. Louis.

Dr. Edward S. Blake has been appointed a senior scientist with Monsanto's research & engineering division at Dayton.

Alden N. Crawford has been appointed assistant corporate advertising manager for Monsanto Chemical Company at St. Louis.

Chester L. Knowles Jr. has joined the planning group of the engineering department of Monsanto's plastics division at Springfield, Mass.

John R. Smith, Trenton, Mich., has been appointed personnel superintendent at Monsanto's Soda Springs, Idaho, plant.

Elmer L. Boehm has joined the Monsanto engineering department at St. Louis, Mo.

Dolores V. Lopiekes has joined the special projects department of the research & engineering division at Everett, Mass.

John D. Schallhorn has joined Monsanto's Inorganic Chemicals Division at El Dorado, Ark.

Joseph L. Romano, New Orleans, La., has joined the engineering department at Luling, La.

J. I. Case

Marc B. Rojtman, president of the **J. I. Case Company,** just announced the appointment of **Robert J. Nixon** to a management staff position at the company's headquarters in Racine, Wisconsin. Mr. Nixon, prior to joining Case, was president of Motor Products Corporation of Detroit.

Pending Mr. Nixon's assuming his full staff responsibilities in Racine, he has been assigned the interim position of director of manufacturing —harvesting division, and will head the Bettendorf Works, one of the largest operations of the company.

Bemis

Walter I. Rodgers, administrative assistant to **F. G. Bemis,** president of the **Bemis Bro. Bag Company,** has been appointed assistant to the manager of the company's East Pepperell, Massachusetts, multiwall bag factory.

Mr. Rodgers, in addition to performing administrative duties, has worked on a number of special projects within the company during the past two years. He will assist the East Pepperell manager, **F. G. Bemis, Jr.,** in operation of the plant which manufactures multiwall and small paper bags. Mr. Rodgers joined Bemis in 1947.

Farm Bureau Cooperative

Appointment of **John S. Mark,** Columbus, as manager of the Chemical Processing division for the **Farm Bureau Cooperative Association, Inc.,** Columbus, Ohio was announced by **Wayne H. Shidaker,** vice president and director of divisional operations. Mr. Mark became associated with the Farm Bureau Cooperative Association in 1956.

He is now serving his fourth term on the executive committee of the Fertilizer Safety Section in the National Safety Council. He is currently chairman of the Council's Engineering Committee.

Royster

C. J. "Cash" Cahill first of this month joined **F. S. Royster** to be their representative in the mid-West, selling triple superphosphate and related materials in the same area he has been covering for **National Potash.**

Cahill

IMC

Election of two new directors to the board of **International Minerals & Chemical** was announced by **Louis Ware,** IMC board chairman and chief executive officer.

They are **Dr. J. W. Dunlap,** Stamford, Conn. research scientist and consultant to the U.S. Defense Department on its guided missiles and aircraft program, and **Henry W. Meers,** Chicago investment banker.

Donald Lewis, winner of several important agricultural awards last year, has accepted a position as supervisor of sales in Vermont and New Hampshire for International. The appointment is effective April 1.

Rome Schwagel, vice president of **Eastern States Soil Builders,** Inc., has been named supervisor of sales in a six-state area for IMC.

Schwagel will represent IMC rock phosphate in Maryland, Delaware, Virginia, West Virginia, North Carolina, and South Carolina. The appointment is effective April 1. Mr. Schwagel, who has been in the fertilizer business for 11 years, will continue his association with Eastern States.

Hough

G. A. Gilbertson, president, **The Frank G. Hough Co.,** Libertyville, Illinois, has just announced the appointment of **Herman R. Brown** as sales manager, "Payloader" division.

Mr. Brown has been associated with the company for 14 years and was formerly Western regional manager. **Kenneth B. Larkin** has been appointed Eastern regional manager. **Robert L. Knox** has been transferred to Central regional manager. **Donald O. Ross** becomes Western regional manager.

Fischer & Porter

Horace F. Richter, Jr., has been named to the newly-created post of sales coordinator by **Fischer & Porter Company,** Hatboro, Pa. Mr. Richter will implement sales policies, coordinate operating activities between the company's home office and its field force, and direct the sales training program for the company's line of flowmeters, industrial instruments, automation equipment.

He has been with Fischer & Porter for 19 years.

Dust Suppression

Quentin Keeny has joined **Dust Suppression and Engineering Co.** of Lake Orion, Michigan, as sales manager. He was formerly with the process development staff of **General Motors.**

Industry Meeting Calendar

DATE	EVENT	LOCATION	CITY
June 9-10	Southern Fert. Control Officials	Velda Rose Motel	Hot Springs, Ark.
June 14-17	National Plant Food Institute	Greenbrier Hotel	Wh. Sul. Sprgs., W. Va.
June 29-30	California Fertilizer Conference	University of California	Tacoma, Wash.
July 7-9	Pacific N.W. Fert. Conference	Winthrop Hotel	Davis, Calif.
July 15-18	Southwest Fertilizer Conference	Galvez Hotel	Galveston, Tex.
Aug. 18-22	Canadian Fertilizer Assn.	Bigwin Inn	Lake of Bays, Ont.
Sept. 24-25	Northeastern Fertilizer Conference	Biltmore Hotel	New York City
Oct. 14-16	Pacific N.W. Fertilizer Convention	Chinook Hotel	Yakima, Wash.
Nov. 9-11	California Fertilizer Association	Fairmont Hotel	San Francisco, Calif.

RESEARCH RESULTS AND REPORTS

Potash Packs A Peck Of Peppers

If you want to grow bell peppers successfully don't skimp on your potash, extensive tests now going on at the Georgia Mountain Experiment Station indicate.

On tests started in 1954, treatments have consisted of nitrogen, phosphate, and potash with a lime variable included in two of the studies, report University of Georgia agronomists M. B. Parker, J. E. Bailey, and H. D. Morris according to the American Potash Institute.

Among the interesting results they have observed so far are:

1—Pepper yields were increased by nitrogen, phosphate, and potash. But lack of potash cut yields more than lack of nitrogen and phosphate.

2—Financial returns from applying each nutrient were striking — with the greatest economic return coming from the application of potash. When fertilizer valued at $26.00 was added to one field of bell pepper, the increased return per acre **above fertilizer cost** was over $400.

3—Lime benefited plant growth and increased pepper yields. But it was ineffective on some yields when potash treatments were less than 100 pounds per acre. Four tons of lime to a low potash soil resulted in severe potash deficiency symptoms. Liming soils without applying adequate amounts of potash, to pepper could become a serious problem.

4—In the 1957 experiment, on low fertility State Loam Soil, pepper yields were increased by adding a complete fertilizer — sometimes as much as 2.9 tons per acre over the control crop. And when either nitrogen, phosphate, or potash was omitted from the fertilizer, yields dropped approximately 1.5 tons per acre.

5—Nutrient deficiencies are distinct in pepper, with some symptoms being quite different from those of other plants.

Details are available through the News Service, American Potash Institute, 1102 16th Street, N.W., Washington 6, D. C.

Vitamin B-1 For Rice Plants

A Kyoto (Japan) University agricultural scientist has discovered that injecting one milligram of vitamin B-1 into a rice plant will increase production by at least 10 percent.

174 Bushels Of Corn Per Acre Reported

An average of 83 bushels of corn per acre were produced by 40 Tennessee farmers on 308 acres in a demonstration program conducted by the University of Tennessee Agricultural Extension Service, according to NPFI. The average corn yield for the state during this same period, 1958, was less than 30 bushels per acre, according to Dr. W. B. Bishop, Extension Agronomist for the University of Tennessee.

Data from the Extension Service and Experiment Station indicate that corn produced at this yield level costs the farmer about 55¢ per bushel and netted about $70 per acre.

The average fertilizer treatment was 100 pounds of N, 50 pounds of P_2O_5, and 60 K_2O per acre. Soil testing played an important role in producing these high yields, Bishop continued, by indicating the level of available phosphate and potash as well as the level of soil acidity. In spite of low rainfall on some fields, high yields were obtained from the use of fertilizer combined with other good management practices.

One hundred seventy-four bushels of corn per acre was the highest yield recorded in these demonstrations.

Patent Asked On Tomato Dust

The University of Kentucky has applied for a patent on a hormone-boron dust developed by a U. K. scientist whose tests have shown it increases tomato production about 3 pounds to the plant.

The hormone-boron dust experiments were started several years ago by Dr. E. M. Emmert, U. K. horticulturist.

Dr. Emmert said that the dust when applied to tomato plants in the field resulted in a yield of 7½ pounds of tomatoes a plant as against 4½ pounds for undusted plants.

Using Water Efficiently Vital In Southwest

Timing irrigation properly and keeping soil fertility high are musts in the semiarid high plains of the Southwest if the limited water supply is to be used efficiently.

Hybrid grain sorghum, a 2-million-acre crop on the Texas high plains, is an example. In USDA studies at Bushland, Tex., efficient water usage required 20 to 22 inches of moisture in the growing season (including plenty at the boot and soft-dough stages), and high fertilization—up to 240 pounds of nitrogen and 20 pounds of phosphorus per acre.

This was pointed up by tests in the dry year of 1956 when rainfall totaled 6¾ inches from June through October. Plots receiving a preplant irrigation of 4 inches and a post-emergence irrigation of 3 inches yielded only 60 pounds of grain sorghum per acre-inch of soil moisture. But when the same irrigations were supplemented with 3 additional 4-inch applications—at 26-inch height, at flowering, and at soft-dough stage—the plots yielded 238 pounds more grain per acre-inch of water.

Similar test methods increased yield per acre-inch of water an average of 35 pounds in 1958 and 86 pounds in 1957—years of more nearly average rainfall distribution.

The studies also showed the important relationship between maintained soil fertility and efficient water usage. Adding nitrogen to test plots in 1958 increased production an average of 152 pounds of grain per acre-inch of ground water.

Forage Supplies Trace Minerals

Cattle grazing on Louisiana's longleaf pine and bluestem range don't need trace-mineral supplements.

USDA's Forest Service and the Louisiana Agricultural Experiment Station found that the abundant forage plants—pinehill bluestem, slender bluestem, narrowleaf panicum, and swamp sunflower—supplied all cattle needs for cobalt, iron, copper,

FULL ORBIT SALES TRAINING MEETINGS A SMASHING SUCCESS!

Full Orbit blazes another new trail in customer service — this time in the interest of upgrading the merchandising practices of the industry. In response to customer requests, 10 sales training meetings were held in key cities around this country and Canada with the sole objective of helping fertilizer manufacturers sell more merchandise profitably. Theory, platitude and generalities were excluded. These were intensive two day sessions devoted to practical, down-to-earth treatment of specific problems chosen by the audience in advance. Approximately 400 representatives of 300 manufacturers were present with middle and top management represented as well as salesmen.

We are sorry if the timing did not permit you to be among them. However, ask our representative to tell you about the many other Full Orbit services — all designed to help you sell more fertilizer profitably.

Here's what fertilizer manufacturers are saying:

William Lust, Tyler Fertilizer Company, Tyler, Texas: "This was a very fruitful meeting for me. It covered specific points and I wish others in our company could have been here."

Forest Viator, Louisiana Agricultural Supply Company, Baton Rouge, La.: "Our time here was well spent, and not wasted. It covered fundamentals. not flashy promotion. It was the best meeting, from a standpoint of being organized, that I can remember attending."

Archie T. Edwards, Red Star Fertilizer, Sulphur Springs, Texas: "Our group was pleasantly surprised by the number of good ideas and good principles covered. We're going to make good use of them and I hope others get a chance to attend."

Stanley Hackett, President, Dixie Fertilizer Company, Shreveport: "This type of meeting should be expanded. I know it's primarily for salesmen, but I got a lot of good out of it as a company president, and hope it's put on again in this area so more people can attend."

Joseph Stobaugh, Southern Cotton Oil Company, Little Rock, Ark,: "This meeting has been rewarding to our group. It reminded us of some places we may have slipped in our selling, and it shows the need of stressing product quality."

T. H. Golson, Wesson Oil & Snowdrift Company, New Orleans: "This has been one of the best meetings I have attended from the standpoint of bringing back some of the things we might have known but have quit using. It covered fundamentals and will be helpful to industry because it gives them something to think about besides price."

R. G. Dozier, Jr., Dawson Cotton Oil Company, Dawson, Ga.: "I am thankful for this very educational and constructive meeting. I got a lot out of it."

Les Engler, Commonwealth Fertilizer Company, Russellville, Ky.: "It was a very profitable meeting and was handled in a stimulating manner."

Producers of Living Minerals

MINERALS International CHEMICALS

20-59

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

Administrative Center — **Skokie, Illinois**

manganese, zinc, molybdenum, magnesium, and sulfur, as well as for calcium and potassium. Moreover, the plants contained good supplies of these elements at all stages of growth.

There is need, however, to supplement this forage with additional crude protein and phosphorus.

Potash Solubility Has No Yield Effect

The degree of "Water Solubility" of potassium fertilizer apparently has no effect on crop yields.

Recent University of Minnesota studies showed that corn fertilized with potassium metaphosphate and potassium pyrophosphate—two "low solubility" fertilizers — yielded as well as fields getting potash in conventional high-solubility form.

Common form of potash in Minnesota fertilizers is muriate of potash. This is 100 percent soluble in water. In potassium metaphosphate, 45 percent of the potassium is water soluble and a fourth of the potassium in the pyrophosphate form is soluble.

J. R. Kline and A. C. Caldwell, soils scientists, made these studies. They were checking on two things: whether solubility differences would affect yields and whether lower solubility fertilizer would make potassium more uniformly available to crops over a longer period of time.

The answer seemed to be "no" on both counts.

Jet Stream May Apply Nitrogen

Jet may mean more in the future to farmers than only a type of power for airplanes.

That is, if research by agricultural engineers at the University of Illinois proves that a jet stream will put anhydrous ammonia fertilizer where you want it in the soil at half its present cost of application.

Dean Hopkins and George E. Pickard are the agricultural engineers working on the problems of anhydrous ammonia injection. They are designing various jet nozzles and pressure tanks to work on present tractors and farm equipment.

CHANGES

Mutual

Mutual Fertilizer has become an affiliate of **Southern Fertilizer & Chemical,** as we reported here last month. But both companies are in Savannah, not in Charleston—as we made it read, though we knew better all the time!

Sunland To FMC

Sunland Industries, Inc., Fresno, producer of agricultural chemicals and seeds, has been purchased by **Food Machinery and Chemical Corporation** it was announced jointly by FMC chairman, **Paul L. Davies,** and **Beverly H. Jones,** chairman of Sunland. The acquisition, subject to obtaining regulatory approval, is being made through exchange of an undisclosed number of shares of FMC common stock for all of the outstanding stock of Sunland.

Sunland Industries has been associated with California agriculture for over 30 years as a producer of insecticides, fertilizers, and seeds for Central and Northern California agricultural areas. FMC, through its Niagara Chemical Division is one of the nation's leading producers of agricultural chemicals.

Means Buys Columbia

Controlling assets of **Columbia Farm Supply,** Lewiston, Idaho, has been purchased from **Phillips Petroleum** by the **Mark Means Co., Inc.,** dry fertilizer, feed and seed firm.

Columbia has been operated by Phillips since Oct. 15. The operation was established in 1954 by **McCall Farm Chemical.**

Joy

The establishment of a district office in Philadelphia has been announced by the industrial division of **Joy Manufacturing Company,** manufacturers of air compressors, dust collectors, fans, and conveyors.

Richard H. Schlobohm has been appointed as district manager.

The office is located at 1420 Walnut Street, Philadelphia. It will serve Joy's industrial division customers in portions of Pennsylvania, New Jersey, Maryland, Delaware, Virginia, West Virginia, and the District of Columbia.

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No other process begins to compare with *way-ahead* Sackett SUPER FLO in making normal, fortified and triple super-phosphates of premium quality at *way lower* cost.

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Step ahead of competition by entrusting your fertilizer expansion and modernization facility programs to our care. Many of the most forward-thinking fertilizer producers are glad they did.

GRANULAR FERTILIZER
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There is nothing that appeals to a man's reason more than plain facts. And, one plain fact is this . . . you can help yourself to bigger profits by resolving *now* to replace wasteful obsolete plant equipment with the latest rock-bottom cost methods as exemplified in Sackett Production Processes and Materials Handling Equipment. Why not start the ball rolling by writing or phoning us today?

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Report on Fertilizer Consumption in the 6-County Intensified Soil Fertility Area of Georgia

RESULTS OF A REAL CRASH PROGRAM

as reported to the Georgia Plant Food Educational Society Meeting, January 13, 1959

by Ralph L. Wehunt
Extension Agronomist—Soils and Fertilizer
University of Georgia College of Agriculture

An Intensified Soil Fertility Program was initiated by the Georgia Agricultural Extension Service last fall on a "pilot" basis. The program was conducted, under the leadership of county agents and their assistants, in the six Southcentral Georgia counties—Colquitt, Coffee, Tift, Thomas, Worth, and Laurens.

One objective of the program was to focus attention on the use of the right kind and amount of fertilizer and lime for profitable crop production. This report will show that the program had a marked influence on more efficient fertilizer usage in the six counties. The information in this report should be useful in pointing up to agricultural workers and to fertilizer industry leaders the value of an educational program on soil fertility.

Fertilizer consumption data are those reported by the Georgia Department of Agriculture for the period January 1 to December 31, 1957, and the period January 1 to December 31, 1958.

In evaluating these data, it should be kept in mind that a fairly large crop acreage in the six counties was placed in the Soil Bank. In fact, about 50,072 acres of cotton, tobacco, wheat, and corn were taken out of cultivation in 1958. Approximately 33 percent—or 32,824 acres—of cotton were put in the Soil Bank Program.

Here are some statistical highlights which show the impact of the Intensified Soil Fertility Program on fertilizer consumption in the six counties:

Farmers used more fertilizer: Total consumption of all mixed fertilizers and materials increased in the six counties from 160,993 tons in 1957 to 177,206 tons in 1958. This was an increase of 16,213 tons — or 10.1 percent. However, because more higher analysis fertilizers were used, consumption of actual plant nutrients increased 17.5 percent. It is estimated that farmers in the six counties purchased $1,238,000 more fertilizer in 1958 than in 1957.

All of the three major plant nutrients registered gains in 1958. There was a 26.7 percent increase in nitrogen (N), 9.3 percent in phosphate (P_2O_5) and 18.3 percent in potash (K_2O). Although 9.4 percent more nitrogen was used in mixed fertilizers in 1958, the greatest gain was from materials. Nitrogen applied as materials increased 45.0 percent in 1958 over 1957.

Farmers used less low-analysis non-recommended fertilizers: About 24.9 percent of the fertilizer used in the six-county area during 1957 consisted of non-recommended grades, such as 4-8-8 and 4-8-6. But only 14.7 percent of the fertilizers used in 1958 were non-recommended grades. About 28,281 tons of 4-8-8 and 4-8-6 fertilizers were used in 1957 as compared to only 17,379 tons during 1958. The consumption of 4-8-6 decreased 58.0 percent and 4-8-8 about 32.1 percent. It is estimated that this reduction in low analysis fertilizer saved farmers $84,000.00.

Farmers used more high-analysis, recommended fertilizers: Consumption of 5-10-15 fertilizer in the six Soil Fertility Program counties increased from 3,027 tons in 1957 to 19,937 tons in 1958—a gain of 558.5 percent.

Total Plant Nutrients Increased 17.5 Percent

Year		Nitrogen (tons N)	Phosphorus (tons P_2O_5)	Potash (tons K_2O)
1957	Mixed Goods	5,857	13,938	14,261
	Materials	5,540	312	299
1958	Mixed Goods	6,404	15,122	16,764
	Materials	8,033	455	473
Tonnage Increase		3,040	1,327	2,677
% Increase		26.7	9.3	18.3
% Increase—all nutrients:		17.5		

Average Nutrient Content of Fertilizers Greater

Year	Nitrogen (N)	Phosphorus (P_2O_5)	Potash (K_2O)
1957	4.0	10.5	10.5
1958	4.1	10.8	11.5
Difference	+0.1	+ 0.3	+ 1.0

Major Shifts Occurred in Fertilizers Ratios*

	Even P_2O_5-K_2O %	High P_2O_5-Low K_2O %	Low P_2O_5-High K_2O %
1957	90.1	6.6	3.3
1958	80.2	3.2	16.6

*Needed according to soil test information

Changes In Mixed Fertilizer Usage

Grade	1957 (tons)	1958 (tons)	Difference Tons	Difference %
3-9-9	17,696	13,675	— 4,021	— 22.7
3-9-18	1,143	2,256	+ 1,113	+ 97.4
4-8-6	6,970	2,927	— 4,043	— 58.0
4-8-8	21,311	14,452	— 6,859	— 32.1
4-12-12	64,196	70,663	+ 6,467	+ 10.1
5-10-15	3,027	19,934	+16,907	+558.5
6-12-12	7,220	6,773	— 447	— 6.2
0-14-14	631	2,169	+ 1,538	+ 41.0

Changes In Nitrogen Material Usage

Material	1957 (tons)	1958 (tons)	Difference Tons	Difference %
sodium nitrate	6,591	6,756	+ 165	+ 2.5
ammonium nitrate—limestone mixtures	3,977	4,314	+ 337	+ 8.5
ammonium nitrate	9,133	13,381	+4,248	+ 46.5
anhydrous ammonia	614	1,790	+1,176	+191.5
liquid nitrogen	533	583	+ 50	+ 9.4

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In fact, about 92 percent more 5-10-15 fertilizer was used in the six, fertility counties during 1958 than was used in the entire State (159 counties) in 1957. Similar, but less striking, increases were noted for other high-potash fertilizers, such as 3-9-12 and 3-9-13.

Consumption of 4-12-12 fertilizer increased from 64,196 to 70,663 tons—or 10.1 percent—in 1958 as compared to 1957. Also, about 41.0 percent more 0-12-12 fertilizer was used in 1958.

Many farmers used a different kind of fertilizer: About 90.1 percent of the fertilizers used during 1957 contained an even amount of phosphate and potash, such as 4-12-12 or 6-12-12, as compared to only 80.2 percent in 1958. Approximately 6.6 percent of the fertilizers used in 1957 contained a high phosphate-low potash content as compared to only 3.2 percent in 1958.

The big shift occurred in fertilizer ratios with a low phosphate-high potash content, such as 5-10-15. About 3.3 percent of the fertilizers used in the six counties during 1957 consisted of low phosphate-high potash fertilizers as compared to 16.6 percent in 1958.

However, notwithstanding the progress made in this program toward use of the right fertilizer ratio, many farmers in the six counties are still using the wrong kind of fertilizer.

The average nutrient content of mixed fertilizers increased: Fertilizers used in the six counties in 1957 contained an average of 25.0 percent plant nutrients as compared to 26.4 percent in 1958. Most of this increase was due to potash. The average potash content of fertilizers used in 1957 was 10.5 percent as compared to 11.5 percent in 1958.

Farmers used more nitrogen: About 3,040 tons more actual nitrogen were used during 1958 than in 1957. Although the consumption of all nitrogen materials increased, there was a definite trend to high analysis materials. About 9,132 tons of ammonium nitrate were used in 1957 as compared to 13,381 tons in 1958—a gain of 46.5 percent. Anhydrous ammonia usage increased 191.5 and liquid nitrogen 9.4 percent.

Farmers used more lime: Although no accurate figures are available on lime consumption, suppliers in the six-county area have indicated that lime consumption was **three to five times greater in 1958** as compared to 1957.

Crop yields were increased: According to county agent estimates, the average corn yield in the six counties was 39.8 bushels per acre in 1958. This is an increase of 121 percent over the 1951-55 Crop Reporting Service average of 18 bushels. The average cotton yield in the six counties was estimated to be 462 pounds of lint per acre. This is an increase of 56 percent over the 1951-55 average of 296 pounds.

A nine-county check area, with similar soil and climate conditions, was selected to compare with crop yields in the six-county soil fertility area. Corn yield was 6.7 bushels and cotton yield 43 pounds of lint greater in the six-county fertility area than estimated yields of these two crops in the nine-county check area. The value of these yield increases amounts to approximately $3,712,000. In other words, the increased yield from just two crops in the six fertility counties as compared to the nine-county check area offset the $1,238,000 spent for additional fertilizer in the six fertility counties by about $3 to $1.

In summary, this program has shown that a well-organized team approach to soil fertility problems by enthusiastic workers can have a tremendous beneficial influence on more efficient fertilizer usage. Soil samples in the six Intensified Soil Fertility counties spurted from 2,200 last year to 14,014 this season—more than six times as many. Also, this reort shows that soil tests can play a major role in focusing attention on use of the right kind and proper amount of fertilizer and lime for the most economical production of cros.

Grace, Pechiney and Foster Wheeler Team Up to Offer Proven Urea Process

Three well known companies representing three stages in the life of a chemical: process development; plant engineering and construction; and production have entered a novel arrangement for the future sale of a proven process to make urea. Urea in 1828 became the first organic chemical to be made synthetically. It has come into increasing prominence in the past ten years as production has zoomed in the United States and abroad.

Pechiney of France who pioneered the total recycle process by making urea from ammonia and carbon dioxide using a neutral oil slurry to recycle unconverted raw material, will license its original know-how and rights through the internationally known engineering and construction firm of Foster Wheeler Corporation. The process will be commercially augmented by joining with the actual large scale operating know-how and experience obtained over the past five years by W. R. Grace & Co., one of the first licenses of the Pechiney process in the United States.

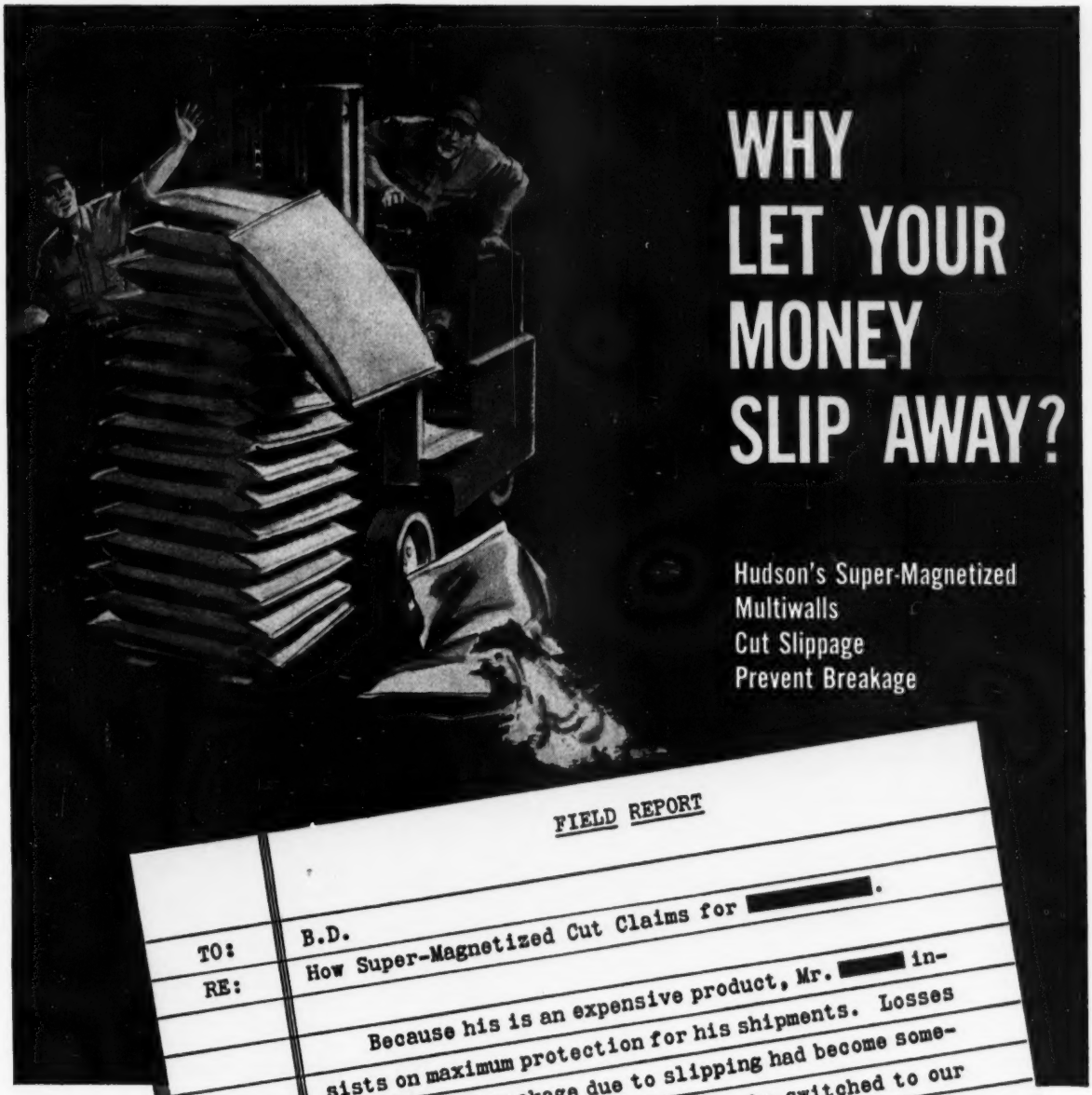
The new arrangement will benefit companies interested in making a urea of exceptionally high purity and low biuret content for fertilizers, animal feed and industrial uses such as paper sizing, glue, textile treating and many other uses including plastics and resins.

The process, known as the Pechiney-Grace Process, will incorporate all of the most recent advances in urea production and quality control developed at Grace Chemical Division's Memphis plant.

Since construction was completed in 1955, Grace engineers have simplified the basic synthesis design; experimented and developed important modifications to the system; improved evaporation and prilling techniques and added new purification and ammonia recovery systems. Currently, Grace with the assistance of Foster Wheeler is doubling the capacity of their 150 tons per day plant and will be on stream with their new operation by early summer.

Firms obtaining a license for the process through Foster Wheeler Corporation will benefit by the improvements in plant performance developed by Grace. Start-up difficulties normally encountered in many new chemical operations will be minimized and in many cases virtually eliminated through this important exchange of process know-how.

Grace, at the option of the customers who acquire the Pechiney-Grace Process will also consider negotiating a separate agreement on a fee basis to train customers' personnel at its Memphis plant. On this basis, Grace will also supply any special services desired such as furnishing its own production engineers to assist during start-up operations for future customers.



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CF Staff—Tabulated TONNAGE REPORTS

FERTILIZER TONNAGE REPORT (in equivalent short tons) Compiled by Cooperative State Control Officials and Tabulated by COMMERCIAL FERTILIZER Staff

STATE	February		January		Oct.-Dec. Qtr.		July-December		January-June		YEAR (July-June)	
	1959	1958	1958	1957	1958	1957	1958	1957	1958	1957	1957-58	1956-57
Alabama	56,732	46,709	22,378	14,989	108,599	96,046	199,265	172,721	734,062	808,901	906,783	983,614
Arkansas	21,308	19,342	8,769	8,456	21,992	17,829	64,092	62,752	226,889	265,235	289,641	325,150
Georgia	41,056	36,031	40,246	34,593	187,378	169,097	294,751	269,529	944,618	980,824	1,214,417	1,234,383
Kentucky	-------	33,137*	-------	58,756*	-------	47,868*	-------	88,771*	435,023	444,107	523,794	534,391
Louisiana	13,776	13,938	10,101	6,779	34,219	32,419	64,152	64,192	232,743	200,277	296,935	271,406
Missouri	30,831	25,353	24,637	15,042	198,141	142,402	370,036	335,312	420,615	460,487	755,927	791,830
N. Carolina	133,076	92,288	99,676	66,664	138,453	127,161	228,055	199,466	1,261,685	1,300,353	1,461,131	1,516,587
Oklahoma	7,990	6,147	2,883	4,110	25,438	21,604	68,848	51,436	55,964	52,836	107,400	107,345
S. Carolina	87,345	55,527	56,071	25,022	76,102	68,388	134,202	116,874	615,733	694,571	732,607	817,500
Tennessee	32,137	12,981	17,374	5,053	47,773	66,286	127,116	135,717	307,182	383,457	442,889	524,638
Texas	61,617	45,897	38,325	24,498	119,006	104,683	222,800	213,801	452,327	392,770	666,128	595,176
California	(reports compiled quarterly)				245,738	225,490	450,767	441,969	679,577	663,484	1,123,235	1,079,748
Oregon	(reports compiled quarterly)				17,175	17,140	50,176	44,793	132,511	138,926	177,304	201,073
Virginia	(reports compiled quarterly)				84,147	66,405	160,178	140,783	549,773	600,158	690,556	754,233
Indiana	(reports compiled semi-annually)						316,260	284,959	795,506	781,268	1,080,465	1,087,185
New Hampshire	(reports compiled semi-annually)						4,746	3,996	16,053	15,730	20,019	18,983
TOTAL	**485,868**	**354,213**	**320,460**	**350,721**	**1,304,161**	**1,202,818**	**2,755,444**	**2,631,067**	**7,860,261**	**8,183,384**	**10,489,231**	**10,843,242**

------- (not yet reported) * Omitted from column total to allow comparison with same period of current year.

MATERIALS MARKETS

ORGANICS: The market on fertilizer organics is quite tight, with supply short of overall demand. Prices are strong. Nominal prices for leather nitrogenous tankage are $3.50 to $4.75 per unit of ammonia, bulk, f.o.b. shipping point. Imported leather tankage has been indicated at $5.00 to $5.65 per unit of ammonia, in bags, CIF.

SEWAGE SLUDGE: The market continues nominal at $3.25 per unit of ammonia, and 50¢ per unit of APA bulk, f.o.b., for one major midwest producer, but due to plant difficulties, shipments are currently curtailed even against contracts.

CASTOR POMACE: Domestic production is now $34.00 to $35.00 per ton in bags, f.o.b. Middle Atlantic shipping point, but the producers are sold out through May, and only will book limited quantities for June/July. Imported material continues to be quoted at $5.00 per unit of ammonia in bags, ex-vessel Tampa, Florida, for shipment from abroad, or $5.25 per unit of ammonia ex-store at Tampa.

DRIED BLOOD: Unground sacked blood in the Chicago area is indicated around $7.50 to $7.75 per unit of ammonia, and in the New York area around $7.00.

POTASH: Demand is now in high seasonal volume, as movement of mixed fertilizers expands to the consumers. Prices continue steady at previously announced seasonal schedules. Imported prices continue as scheduled, and periodic arrivals supply coastal areas.

GROUND COTTON BUR ASH: Supply of this type of potash, primarily in the form of carbonate of potash, continues adequate for the current demand, which is steady at prices approximating the cost of domestic sulphate of potash for most areas, and at somewhat lower delivered costs for southeastern areas.

SUPERPHOSPHATE: Demand has improved considerably, and in certain Southeastern areas, producers' prices have been advanced slightly. Supply also has tightened somewhat.

AMMONIUM NITRATE LIMESTONE: Demand continues excellent as the season progresses, and prices are currently $41.50 per ton bulk, and $45.50 per ton bagged, f.o.b. Middle Atlantic production, and f.o.b. cars at Atlantic and Gulf Ports.

SULPHATE OF AMMONIA: Price continues steady at previously announced levels, and demand is in good balance with supply.

NITRATE OF SODA: No change in price is noted from previously announced basis, and demand is in good seasonal volume.

GENERAL: Fertilizer manufacturing activity in the Southeast is in seasonal high gear, and in other areas, activity is also increasing. Most basic fertilizer raw materials are in ample supply, with the exception of natural organic ammoniates. Superphosphate in certain areas is advancing slightly in price against a strong demand.

OREGON FERTILIZER LAW: Amendments to the Oregon Fertilizer Law have been passed and the bill signed by the Governor. Briefly, the law will permit the Director of Agriculture to set fees not to exceed 10 cents per ton; it also changes the date to the Calendar year, so no doubt the next fee period will start January 1, 1960. Just what tonnage fee will be set is not known at the present time, but undoubtedly it will be reduced. Also the law gives the Director the power, after consultation with the Soils Department of Oregon State College and, after public hearing, to define the elements constituting a fertilizer. The law goes into effect 90 days after signature of the governor—about June 10th.

* * *

IDAHO FERTILIZER LAW: At the Idaho Fertilizer Dealer's Days, Leland Fife, Director of the Plant Industry Department of the Idaho Department of Agriculture, spoke at the various meetings. He admitted the Idaho law was of little value as at present constituted, and agreed to meet with a Committee from Pacific Northwest Plant Food Association to revise the law and submit it to the next session of the Idaho legislature. The Association has forwarded copies of the Oregon law to Mr. Fife and to Ben McCollum, J. R. Simplot Co., legislative chairman.

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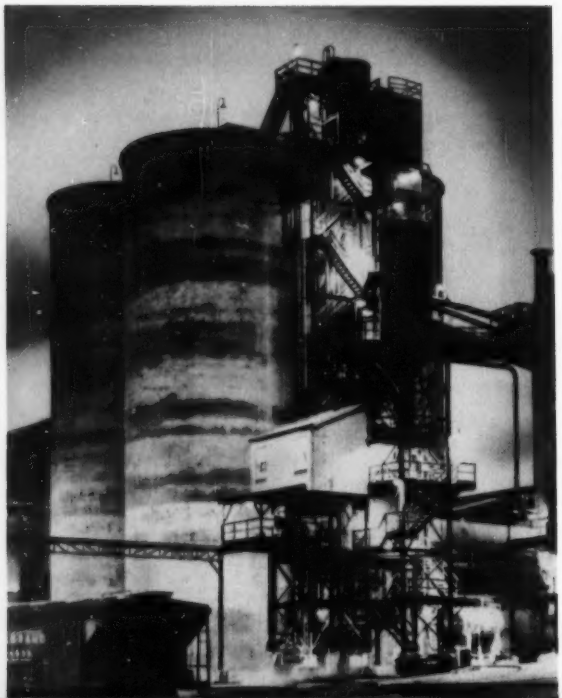

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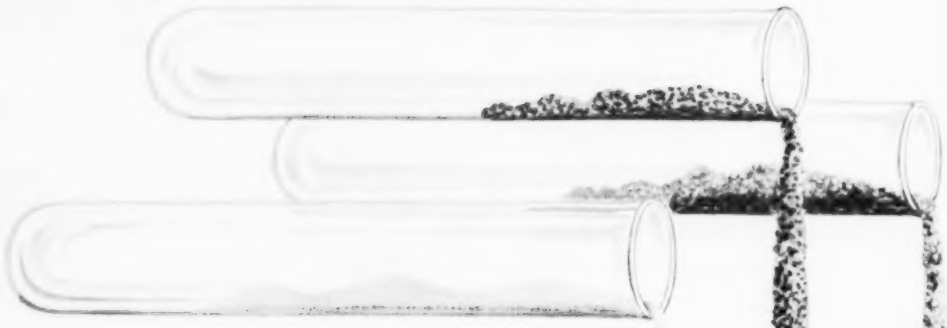

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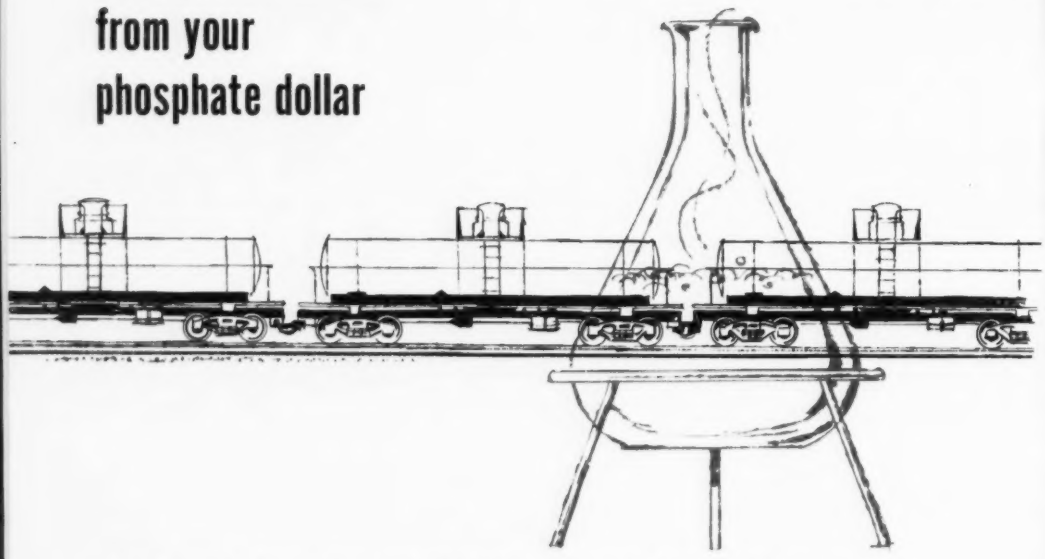

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The International Scene

AUSTRALIA

Domestic Sulphuric Acid Production Up

Though Australia does not have any major deposits of elemental sulphur, production of sulphuric acid has almost doubled since 1938, through the utilization of the sulphur content of other minerals, pyrites in particular. Need for substantial imports still remains, and for the five years 1953-1957 49% of the acid produced in Australia was from imported natural sulphur, 32% from pyrites, 11% from zinc concentrates, 6% from lead concentrates, and the remainder from other materials. In those five years, imports averaged about 170,000 annual tons, from the US and Mexico largely.

AUSTRIA

Linz Exported 990,000 Tons of N

In 1958, the Austrian Nitrogen Works in Linz, Upper Austria, exported approximately 77 per cent of its annual production of nitrogen fertilizer, totaling 990,000 tons. An increase in capacity of the plant made it possible for the prices of the Austrian nitrogen products to be kept so low that in Europe lower prices can be offered only by the Italian nitrogen industry, whose production is based on the utilization of natural gas.

BRAZIL

Fertilizer Consumption Climbs

Consumption of fertilizers increased in Brazil during 1957 to approximately 710,000 metric tons. The materials consumed consisted of 146,000 tons of nitrogenous, 370,000 tons of phosphatic, 99,000 tons of potassic, 30,000 tons of organic products, and 65,000 tons of mixed fertilizers. More than 70 percent of the total was imported. Domestic production accounted for 107,000 tons of superphosphate, 63,000 tons of ground phosphate rock for direct application, 6,000 tons of ammonium sulfate, and the entire 30,000 tons of organic materials. In addition to the phosphate rock used for direct application, 85,000 tons of rock, about half of which was imported, entered into production of superphosphates.

The new Cubatao plant for production of ammonia, nitric acid, and ammonium nitrate is reported to have begun operations in February 1958. Another nitrogen plant under construction at Aratu, Bahia, is expected to be in production by the end of 1959. Prices of fertilizers have increased as much as 30 percent in Brazil, but manufacturers have been able to sell all they make. The Brazilian Government is endeavoring to encourage the industry by tariff protection and by providing preferential exchange rates on imports of manufacturing equipment. Industrial observers feel that Brazil's chemical fertilizer industry is entering a stage of rapid growth, and that with impetus from substantial foreign and domestic investment it could occupy an increasingly larger place in the country's economy.

FINLAND

Fertilizers Up for 1957

Total production of fertilizers in Finland amounted to 740,395 metric tons in 1957, compared with 658,951 tons in 1956. Compound fertilizers accounted for 266,381 tons in 1957. Fertilizer materials produced include superphosphate, "Kotka" phosphate, ground phosphate rock, calium cyanamide, calcium ammonium cium cyanamide, calcium ammonium nitrate, and ammonium sulfate. Imports supplied 518,157 tons of fertilizers during 1957. Nitrogen solutions are being produced on a small scale for experimental application on oat fields, grasslands, and pastures.

FORMOSA

Produced 208,784 Tons in '58 To Finance N Plant

Fertilizer production in Formosa reached 208,784 metric tons in 1958, according to a statement released by the Republic of China Government. This exceeded the goal of 176,000 tons by 32,784 tons, the statement declared. The total was said to be about six times the peak output during the Japanese occupation of Formosa.

GUATEMALA

Fertilizer Consumption Doubled

Consumption of fertilizers in Guatemala, as measured by imports, has more than doubled since 1955. Imports totaled 27,887 metric tons in 1957 and were running 5 percent higher during the first half of 1958. Leading countries of origin were Germany, United States, Italy, Netherlands, Canada, and Chile.

INDIA

Fertilizer Ingredients Rising in India

Production in the Indian chemical industry is expected to show a marked increase during the remaining two years of the Second Five Year Plan, says an official press release.

This indication, says the note, is based on the progress made for expanding production, including steps taken for ordering machinery, both within the country and from abroad.

Output of sulphuric acid, for instance, is expected to double by 1961 from the 1958 production of 227,000 tons. This increase will come about through the implementation of 12 schemes by which machinery was imported.

Production of superphosphate has more than doubled in the past two years and is expected to rise to 600,000 tons annually by 1961 from 181,000 tons in 1958. Production of nitrogenous fertilizers, which has been more or less steady in the last two years at 80,000 tons of nitrogen is expected to rise to about 400,000 tons of nitrogen by 1961.

IRELAND

As part of the five-year program to expand national income, Ireland will help finance a $17-24,000,000 nitrogenous fertilizer plant, and $24,500,000 on phosphate fertilizer.

JAPAN

Exports Picking Up

Japan's industrial plant export outlook has improved substantially following the placing of several large contracts by the United Arab Republic, Australia and Argentina, and with satisfactory progress reported on similar projects with Peru, Brazil, Pakistan, Iran and Iraq.

Recently concluded contracts call for a fertilizer plant for Pakistan, fertilizer making facilities for India, Iran and Brazil.

KOREA

To Buy US Fertilizer

The Combined Economic Board has agreed to send to Washington a procurement authorization application for an additional $196,000,000

worth of fertilizer to be imported through private commercial channels under the 1958-59 ICA salables program. The entire amount will be nitrogenous fertilizer.

Bidders To Take Delivery

The Bank of Korea has requested the 25 successful bidders in the auction of the $6,100,000 in ammonium sulphate fertilizer to purchase the $2,100,000 earmarked for import of "unpopular" phosphate fertilizer.

The bidders, in participating in the previous auction, submitted certificates that they would be obliged to buy phosphate at a rate of 21 dollars to 61 ammonium sulphate dollars.

The bank will cancel the right to import ammonium sulphate if the trader will not pay for phosphate.

MEXICO

Increased Production Of Sulphuric Acid

The production of sulphuric acid in Mexico last year increased to 246,984 tons, from 191,545 tons in 1956.

Consumption, at 247,721 tons, showed a considerable rise, compared with 194,173 tons during the previous year.

MOROCCO

Phosphate Expected To Exceed All Records

During the first ten months of 1958, phosphate production in Morocco reached 5,220,981 tons, 627,950 of which during October. If the October output is maintained through the end of the year, production will exceed 6,450,000 tons establishing the record ever registered at the Cherifian Office of Phosphates.

Of the above mentioned 5,220,981 tons, 5,093,223 were exported and 82,459 were sold on the local market. On the basis of the October statistics alone, showing 572,000 exported tons, total exports for 1958 would reach an unprecedented 6,230,000 tons, and local sales would amount to 100,000 tons. The resulting grand total of sales, in the amount of 6,330,000 tons, would represent an absolute record since the creation of the Cherifian Office of Phosphates.

NEW ZEALAND

Superphosphate Production Down

Production of superphosphates in New Zealand declined approximately 1 percent during the 1957-58 fertilizer year to 971,870 tons, an 8-percent drop from the peak year 1955-56. About half of the superphosphate produced is sold as such and the other half is marketed in the form of mixtures. Types of mixtures for which demand is increasing include those with serpentine rock, potash, or sulfur, as well as fertilizer mixtures containing insecticides or herbicides. Superphosphates comprise about 90 percent of the fertilizer used in New Zealand. The small quantities of nitrogenous (sodium nitrate, ammonium sulfate, ammonium nitrate, and urea) and potassic fertilizers consumed are imported.

SWEDEN

Superphosphate 70% Of Production

Closely related to the inorganic branch and a source of its development is the 80-year-old fertilizer industry. Superphosphate is the dominent material, accounting for more than 70 percent of production by value. AB. Forenade is the sole manufacturer and also operated Gaddylkens Superfosfatabriker (owner by the Cooperative). Production is more than 550,000 tons annually, ample for domestic needs, and combined sales, exceeded 120 million kronor in 1957. Demand is turning to potassium superphosphate and output of this material rose to 246,000 tons in 1957 from 192,000 in 1956, whereas that of the regular superphosphate dropped to 321,000 tons from 350,000 tons (95% P_2O_5). The company used 269,000 tons of crude phosphate rock in 1957, principally from Morocco, United States, and U.S.S.R.

The newer nitrogen branch produces more than 27,000 tons annually, meeting about half of domestic demand. No noticeable trend toward greater consumption of nitrogenous materials is apparent.

Imports of fertilizers are chiefly of Norwegian calcium nitrate. Exports are negligible.

UNITED KINGDOM

Phosphate Use Up 250%

Since 1927, phosphate usage in the United Kingdom has increased two and a half times. While crop production has increased markedly, it is important to assess whether the much smaller increase in phosphate usuage in relation to other plant nutrients can be encouraged with advantage.

The need for phosphate application to many soils, especially in the West and North of the country is well recognized. It is also said that many of the soils in the better farming areas, to which phosphate has been applied continuously over the years, have now a satisfactory phosphorus status. On such soils it has been found that use of less phosphate than previously has not, in general, restricted crop yields, and field experiments on them have often failed to detect yield increases due to phosphate application. Further, the soil phosphorus status as measured by soil analysis has been satisfactory. These features could well indicate that phosphate can safely be omitted from the fertilizer in some areas for a number of years or that only token amounts need be applied.

Australia Needs More Scientists

More agricultural scientists are being turned out by Australian universities than for a number of years —and still the demand exceeds the supply.

The total number who graduated from the five mainland universities at the end of last year was 117. This was just on twice as many as in 1956.

Yet reports from each of the Faculties of Agricultural Science show that no difficulty is expected in obtaining positions for all new graduates. In some States, such as Western and South Australia, the position is described as a "seller's market."

Nitrogen Division Giving Monthly Weather Forecasts

Nitrogen Division, Allied Chemical Corp., has begun distribution of monthly weather forecasts to its fertilizer dealers and manufacturer customers all over the country. The forecast for each month will be mailed about a week before the month begins.

"Weather is one of the most important factors in the fertilizer business," a Nitrogen Division spokesman pointed out," and we expect the new service to be invaluable to our customers in making sales and manufacturing plans."

The forecasts, said to be 80 per cent accurate, are prepared for Nitrogen Division by Weather Trends, Inc., one of the oldest private weather forecasting services in the nation.

In addition to a summary giving over-all weather predictions, each forecast will include colored charts and maps showing expected precipitation and temperatures in each section of the country.

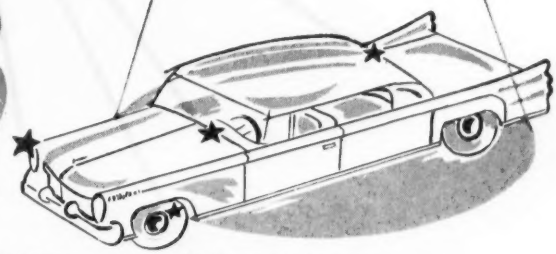
SULPHUR ONE OF THE FOUR STRONG PILLARS OF PROCESSING

INVISIBLE

BUT PRESENT

35 POUNDS OF SULPHUR

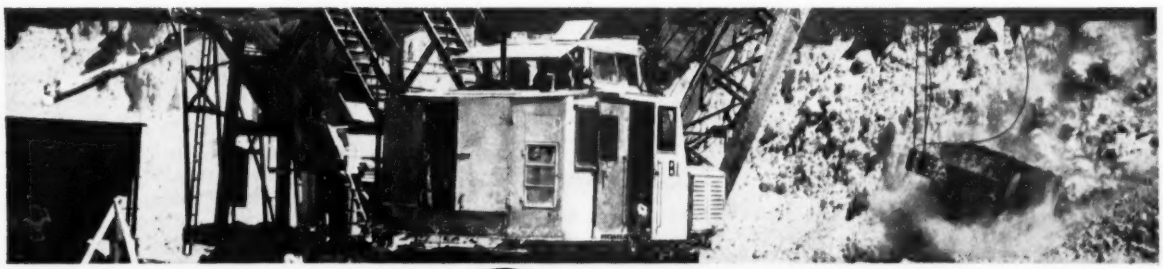
and derivatives help to produce the average automobile



Sulphur enters the automobile picture in two ways: directly and indirectly.

Sulphur, either as the elemental or as one or more derivatives, is used in the manufacture of rubber and rayon. Indirectly, it is used in processing the steel that forms the body. It is used in the plating operation on trim and fixtures. It is deliberately introduced into certain steels to provide better machining qualities.

Recognizing the importance of Sulphur to the basic industries such as the manufacture of automobiles, and to our ever-expanding economy generally, TGS is broadening its service: production, distribution and technical.



SULPHUR PRODUCING UNITS

- Newgulf, Texas
- Spindletop, Texas
- Moss Bluff, Texas
- Worland, Wyoming
- Fannett, Texas

TEXAS GULF SULPHUR CO.

75 East 45th Street, New York 17, N.Y.
811 Rusk Avenue, Houston 2, Texas

Geigy Announces New Iron Chelate

Geigy Agricultural Chemicals announced today the commercial introduction of Sequestrene 138 Fe iron chelate. Geigy pioneered the use of chelated minor elements in agriculture and this new product adds to the growing list of Sequestrene metal chelates now available for the correction of minor element deficiencies in growing plants.

The problem of iron deficiency in the alkaline soils of Southern California and Arizona has been of paramount importance to citrus growers and a serious limiting factor in the production of such important crops as citrus and avocados in that area.

Extensive field testing carried out by Geigy research personnel and cooperators at the University of Arizona and the University of California has established that Sequestrene 138 Fe iron chelate is, by far, the most effective product yet discovered for the correction and prevention of iron chlorosis in those areas.

Although relatively limited quantities will be available, it is believed that adequate stocks can be provided to growers interested in trying out this product under actual commercial conditions.

Ski On Ammonium Nitrates

In Quebec, the Laurentian resort operators are trying a stunt which may let them operate ski-runs longer in the season. They use ammonium nitrate over the snow and it draws out the moisture, making the snow last longer.

Indoor Grass Promoted By Electric Company

Up in Chilliwack, British Columbia, an electric power company is promoting a hydroponics deal where by the farmer can grow grass all winter, and have nice green fodder for his cattle. Where the electric company interest appears is in the 3,000 watt heater and a 1 HP air-conditioning unit. The cows are happy, too!

$63,200,000 In Facilities Forecast For 1960

New fertilizer facilities should run up a total of $63,200,000 during this year and next, according to a forecast by the Manufacturing Chemists Association.

This includes $22.2 million for projects already underway in four states and $41 million for projects scheduled for early ground-breaking in six states.

According to the annual MCA survey, chemical producers in 1958 completed new fertilizer production facilities in 10 States at a cost of $52.5 million.

Total estimated expenditures for these new installations during the three-year survey period, 1958-60, is $115.7 million — all privately-financed.

California with a total of $20.5 million is receiving the largest share of this construction. Following are Mississippi, $16.8 million; Idaho, $16 million; Washington, $14.6 million; Louisiana, $12.5 million; Delaware, $11 million; Kansas, $5.5 million; Arizona, $5.2 million; Missouri, $4.5 million; Arkansas, $3 million; Utah, $2.5 million; Florida, $2.2 million; Alabama, $1.2 million, and Oklahoma, $200 thousand.

Fertilizer sales in Kansas reached an all-time high of 153,619 tons for the last six months of 1958, the State Board of Agriculture, Topeka, Kansas, reported. Sales were reported in all counties except two.

SUPPLIERS TELL US ABOUT NEW EQUIPMENT

New Pump Catalog

Dorr-Oliver is offering five new two-color equipment bulletins bound in a single catalog entitled, "Dorr-Oliver Pumps for Hot or Cold Corrosive and Slurry Service." Containing twenty-two pages, the catalog describes the complete D-O pump line for chemical process and allied industries. Included are line and wash drawings, photographs, specification and performance data, and parts lists.

Recently expanded to provide the widest possible choice of pumping tools, the Dorr-Oliver pump line comprises three distinctly different designs—Type L, alloy metal centrifugal; Olivite, lined centrifugal; and the Oliver Diaphragm Slurry (ODS) pump. The line also includes three new adaptations of the basic Type L.

Copies of the catalog, "Dorr-Oliver Pumps for Hot or Cold Corrosive and Slurry Service," are available by circling Number 1 on CF's Information Service card, page 47.

Safety Shield Flange

A low cost one-piece safety shield, quickly installed to protect workers from surprise high pressure leaks due to gasket failure, has been announced by Ramco Manufacturing Company. The shield is held ½ inch away from edge of flange by spacers. Overlapped and totally enclosed edge breaks force of stream and deflects it at a safe angle. Safety shield slips over existing pipe installations and requires only screwdriver to install.

For further data, circle Number 2 on CF's Information Service card, page 47.

Belt--Saver Pulleys

A new illustrated bulletin on belt saver pulleys has been announced by Sprout, Waldron & Company. Bulletin 35-D gives the diameter, face width, minimum and maximum bore, approximate shipping weight and list price of almost five hundred different pulleys sizes.

Design of these cast iron, wing and cone type pulleys has been known to increase conveyor belt life from 50 to 400%. Copies of Bulletin 35-D are available by circling Number 3 on CF's Information Service card, page 47.

Custom Screw Conveyors

Central Mine and Equipment Company offers new literature describing custom fabricated screw conveyors for chemical and other industries.

Fabricated of such metals as stainless, Inconel, Monel, Hastelloy, Illium, and Nitralloy, Central Mine screw conveyors eliminate problems created in conveying, mixing and blending bulk materials having abrasive or corrosive qualities, and can be obtained in any diameter and pitch.

Literature and complete information is available by circling Number 4 on CF's Information Service card, page 47.

Ammonium N. Explosive Bag

Bemis Bro. Bag Company has prepared a new eight-page pocket-size booklet titled, "13 Questions and Answers," which illustrates and describes its new Explosives Bag constructed of Flexiply (crinkled-kraft paper) tubed around Bemis-extruded pinhole-free Red Line polyethylene. Booklet explains method of filling and closing bag, proper loading techniques, performance and cost data and advantages of using ammonium nitrate-fuel oil mixtures for blasting operations. The booklet is available by circling number 5 page 47.

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TEAR OFF ALONG DOTTED LINE

4-59

COMMERCIAL FERTILIZER *Information Service Bureau*
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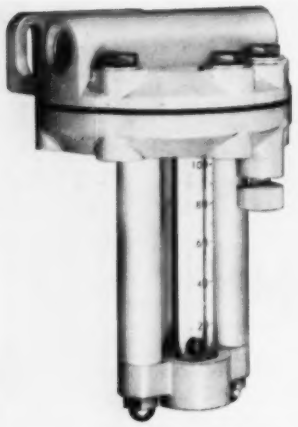
Equipment News . . .



Liquid Chemical Feeders

Fischer & Porter Company has just introduced a new liquid chemical feeder, known as the Micro-H, that accurately meters, regulates, and feeds liquid chemicals continuously at extremely low flow rates from 0.1 to 4.0 gallons per day into a liquid stream. Semi-automatic, the Micro-H features a built-in ejector, a corrosion-proof plastic body, and a porous stone to feed the liquid chemical.

Another liquid chemical feeder, the Super-H accurately meters, regulates and feeds liquid chemicals at low flow rates from 1.0 to 500 gallons per day. The Super-H utilizes a variable-area metering tube rather than a porous stone.

For more information circle Number 6 on CF's Information Service card, page 47.

Worm Gear Speed Reducer

"Universal Worm Gear Speed Reducers" is a new eight-page Link-Belt publication containing complete data on a new type of reducer designed to operate in three different positions; it has a higher capacity with external fins for cooling and is available directly from stock throughout the country.

The folder illustrates various mounting positions that solve problems of space and also contains selection procedures for proper applications. Copies of Folder 2724 can be had free by circling Number 7 on CF's Information Service card, page 47.

'Electro-Matic' Shovel

A data sheet giving specifications and general information on a new Electro-Matic shovel has been made available by the Munson Mill Machinery Company. The Electro-Matic shovel is a new line claimed to cut the time unloading bulk material from freight cars down to as little as one-third of the time formerly needed.

The various components of the shovel are illustrated on the data sheet and include: scoop, cable, pulley, drum and motor, and control box.

The data sheet may be obtained at no charge by circling Number 8 on CF's Information Service card, page 47.

Cone Crusher Bulletin

A newly revised 8-page bulletin describing Symons Intermediate Cone Crushers has been released by Nordberg Manufacturing Co. These crushers are built in 22" and 30" sizes with fine or coarse type crushing cavities for second and third stage reduction crushing.

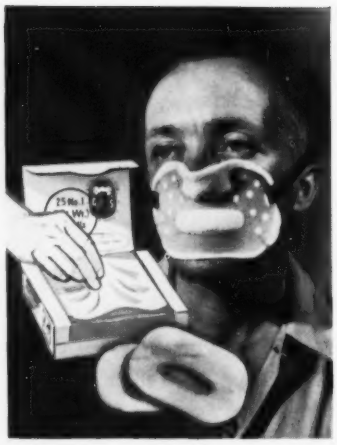
For bulletin 236A, circle Number 9 on CF's Information Service card, page 47.

Belt Conveyors

A new 88 page catalog shows principal belt conveyor products manufactured by Continental Gin Company, including heavy duty and standard roller bearing and precision ball bearing idlers. A comprehensive Engineering Data section contains simplified and condensed information for proper selection of belt conveyors and related equipment. For a free copy of Catalog ID-591 circle Number 10 on CF's Information Service card, page 47.

Dispensing Filter Package

For protection against non-toxic dusts and the hazards of sprays, 'Filtairettes,' a product of General Scientific Equipment Company, refills are now packaged in a new self-dispensing container. The container allows the quick one-at-a-time removal of the refills, without touching any but the filter being put into use.

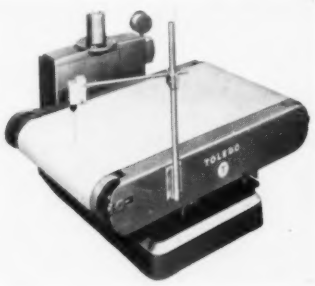


The replaceable cotton filters cost only two cents each. Filtairette Protective Masks, priced at $3.60 per dozen, weigh just one-half ounce, and are pliable to fit the contour of any face for maximum of comfort to the wearer, and can be worn with glasses or goggles, too.

The masks cause no breathing difficulties, and trap more than 400 different varieties of non-toxic dusts and eliminates spray hazards. For full information, circle Number 11 on CF's Information Service card, page 47.

Automatic Checkweigher

Their latest development in automatic high capacity checkweighers, designed to check the weights of items from 50 lbs. to 200 lbs., has been announced by Toledo Scale Division.



This new and revolutionary Automatic Checkweigher will handle packages (depending on size) at speeds of up to 40 items per minute with an accuracy of approximately one part in 3000.

The Model 9460 continuously checkweighs bags, cartons, boxes, etc. with equal speed and accuracy without stopping the item on the scale. The unit may be conveniently and quickly adjusted to change from one package weight to another.

For full data, available on their form 2968, circle Number 12 on CF's Information Service card, page 47.

Under-Over Weight Indicator

A panel-mounted off-weight indicator that safeguards against spoiled mixtures and batches in automatic proportioning systems is being introduced by the Richardson Scale Co.

Designed for use with the Richardson "Select-O-Weigh" automatic proportioning system, the new instrument provides a visual indication of the number of "off weight" graduations for each ingredient weighed by the system. This graduated reading makes it possible to correct a trend to overweighing or underweighing before the actual limit of tolerance is reached, thus preventing spoiled mixtures. Should an off weight equal to or greater than the preset tolerance occur, the system stops until the off-weight condition is corrected or until it is accepted by operation of a keyed bypass switch.

For a fact sheet, circle Number 13 on CF's Information Service card, page 47.

Industrial Truck Selector

Automatic Transportation Company has published a new Industrial Trucks Selector Guide which will be of assistance to all material handling men in setting up new or revising present systems in relation to their specific plant problems. Over 150 models to fit all requirements are illustrated in this 20 page, two-color booklet. The selection factors, such as: capacity, frequency of use, power source and use of semi-standard or special trucks are also given as a ready reference to all Automatic Industrial Trucks.

This Industrial Trucks Selector Guide is available free by circling Number 14 on CF's Information Service card, page 47.

Materials News . . .

Johns-Manville Silica Product

Celite, a Johns-Manville diatomaceous silica product to coat a granule or prill of fertilizer better than commonly used mineral fillers, is dramatized in a recently released brochure.

Diatomite, with its inherent physical and chemical characteristics, is an excellent conditioning agent for fertilizers. This light, fluffy, inert powder is composed of finely divided particles with high surface area. Celite, a superior diatomite, is highly absorbent and has extraordinary affinity for both the granular and prilled fertilizers.

Pointed out in explaining Celite's efficiency as an anti-caking agent are its different particle structure, its loose weight density (less than 10 pounds per cu. ft.) and its high liquid absorption (200%).

For a copy of the brochure, circle Number 16 on CF's Information Service card, page 47.

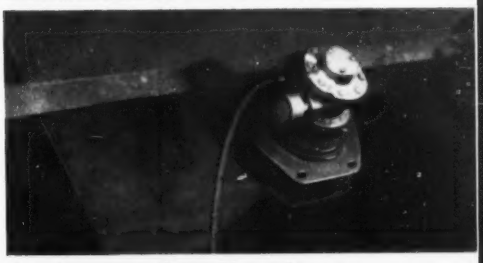
Vibration Inducer

A rugged, new high-amplitude vibration inducer, which starts and keeps materials moving during the unloading of railroad cars or hoppers, has been introduced by Martin Engineering Company.

Called the "Vibrolator CCVP," this unit is designed for materials movement from massive bins, hoppers or chutes. It is portable with its own mounting clamp and can be mounted in any position or angle convenient to the job.

The Vibrolator CCVP is pneumatically-driven, starts and operates with minimum air at any angle, is shock-proof and spark-proof, and can be precisely controlled at any vibration frequency from a few cycles to more than 60 cycles per second. For full details, circle Number 15 on CF's Information Service card, page 47.

Equipment News . . .



Statistical Quality Control - - -

SOME COMMENTS ON TOLERANCE IN FERTILIZER ANALYSIS

by VINCENT SAUCHELLI
Chemical Technologist
National Plant Food Institute

"When looking for applications of statistical quality control in a chemical plant, the place to start an investigation is in the quality control laboratory. Laboratory test results are usually accepted to explain the actual variation in a process; however, from the statistical quality control point of view, we consider three other major factors which can seriously affect the test determination. These are: (1) sampling variation; (2) testing equipment variation; and (3) laboratory personnel variation."* Experience has shown that the sum of these three variations can often exceed the actual variation present in the processing and thereby vitiate the dependability of the results issued by the control laboratory. The application of statistical quality control techniques to determine the precision and accuracy of the workers in the laboratory has enabled many supervisors to raise the quality of the analysts and develop confidence in the results reported by the laboratory.

Analytical chemistry is becoming more and more important to engineers responsible for industrial processes everywhere as well as to sales personnel and consumers. For this reason it is obvious that management should know the quality of work done by analytical chemists and technicians. To obtain this knowledge and to raise the quality of work produced by the laboratory employees, many progressive companies have installed a quality control program on laboratory methods. By this means they can find out the precision and accuracy of the methods used and also of the quality of the work of the control chemists.

Sampling techniques and sampling instruments may introduce variations in the chemical analysis of a fertilizer. Statistical analysis can determine whether such variations are significant. Recent studies on this phase of chemical control seem to indicate that more significant is the thoroughness with which the manufacturer mixes his fertilizer goods. Efficient mixing in the processing stage with perhaps a narrower range in particle size of all the raw material components will do more to help the product stay within the official chemical tolerance limits than refinements in sampling techniques.

* *Statement from a talk by R. V. Ward, statistician, Canadian Industries Ltd.*

Precision and Accuracy

The terms "precision" and "accuracy" have been used previously in these discussions. They have an important difference in their respective meanings as used in statistics. Precision: when two or more experimental values agree closely among themselves but not necessarily with the true value. Accuracy: when an experimental and the true value are in close agreement. Methods or results may be precise but yet not accurate.

Tolerance

The composition of a fertilizer mixture must conform to a guaranteed analysis within close limits, or tolerances. The lower limit is the tolerance permitted by the fertilizer statute; the upper limit is set by the manufacturer. It is a difficult operation to prepare a mixed fertilizer whose composition will exactly conform with its guaranteed analysis. The nature of the raw materials —particle size, shape, density, moisture—and the unavoidable variations in sampling and analytical procedures, the biases of the personnel—make it almost impossible to sample a mixture without error and bias. To avoid penalties and maintain a reputation for quality goods the fertilizer manufacturer seems to prefer to over-formulate his mixtures so as to analyze substantially above the lower limit set by the official regulations.

Dr. Walter A. Shewhart, father of statistical quality control, once said:

"It is not only what the engineer wants but what he can get, or at least get economically, that must be taken into account in the setting of tolerance limits." Modern plant equipment can produce products of any desired degree of perfection. In practice, however, two principal limiting factors govern the degree of accuracy required, namely, (a) the intended use of the material or piece of machinery: tolerances for the quality of a phosphate destined for human food are more severe than those for a crop fertilizer; and (b) the factor of cost. All fertilizer manufacturers are ever willing to cooperate with state control officials in their work of improving sampling and analytical techniques, because they feel it is necessary to have a system that quickly and justly differentiates between honest and somewhat dishonest or sloppy practice. But at the same time, they like to know how advisable it is to try to get such a degree of homogeneity which while it may ease the sampling chore may also impose a cost burden on the farmer out of proportion to its value. This, of course, is another way of saying that the tolerances established for the determination of each plant nutrients in the analysis of a fertilizer should be imposed with careful consideration of the intended use of the product and the cost factor.

Someone has truly said, "Quality must be built into a product, is cannot be inspected into it." Building quality into the fertilizer mixed goods which meet the specifications set forth by the agronomists and horticulturists has been and generally is the aim and avowed purpose of all reputable fertilizer manufacturers. Recent developments in marketing bulk fertilizer in certain areas and which are apparently encouraged by local official agencies seem to ignore all previous agronomic teachings about the necessity for homogeneity in the mixture and the close limits or tolerances in the guaranteed analysis. These developments are causing serious concern to manufacturers and control officials. We do not presume to know the answer. Enforcement of the chemical control statutes or a re-appraisal of agronomic teachings in the light of new evidence that should be produced by scientifically organized field tests seem to be needed. In this connection—that is, field tests—it is suggested that here also the tests should be designed by statisticians skilled in modern techniques in order to assure dependable results.

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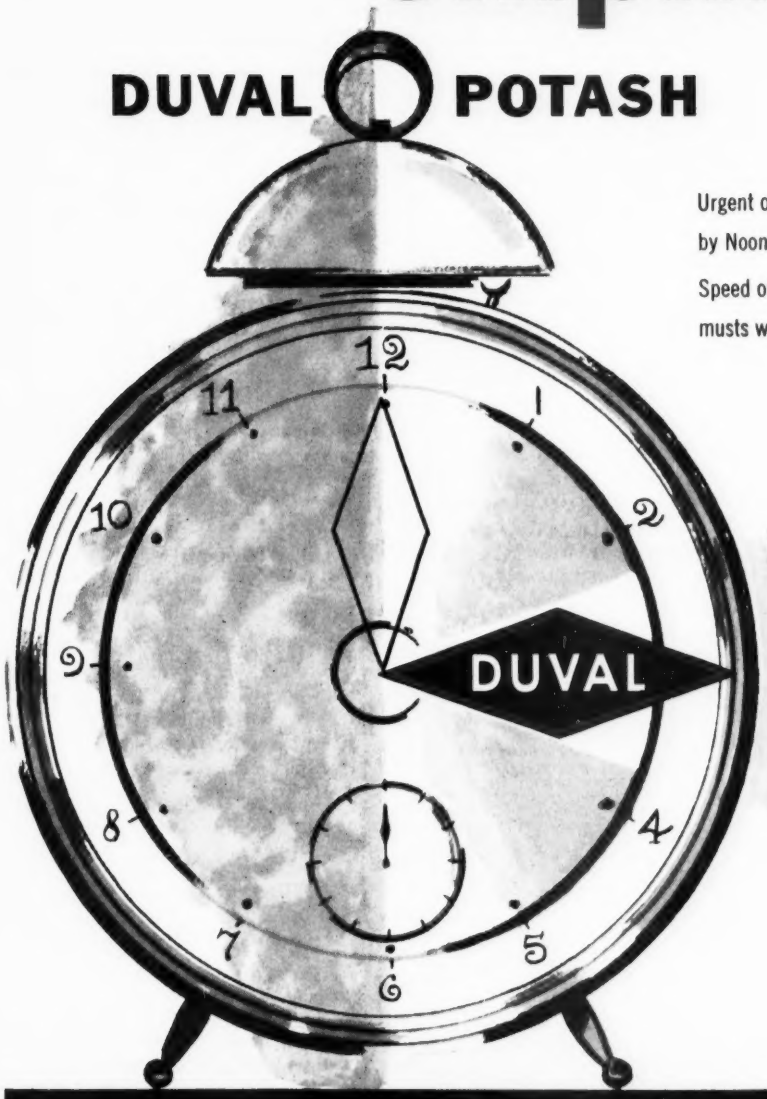

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CALIFORNIA

Best Fertilizer is getting 10% more than designed capacity out of the new Lathrop plant. It is fully in operation now and producing more than 125 daily tons of ammonia.

* * *

Valley Nitrogen is under way with construction of its $9,500,000 plant near Helm, according to **Carl Haas,** president. Major portions of the plant are under the design and construction direction of **Chemical Construction,** which, as our readers know, has just completed an identical plant at Pascagoula, Miss. for **Mississippi Chemical.**

The Helm plant will produce anhydrous ammonia, ammonium sulphate and complete fertilizers. Daily capacity: Anhydrous ammonia, 150 tons; sulphuric, 200 tons; dry fertilizer, 400 tons.

FLORIDA

Texas Gulf Surphur in cooperation with **De Bardeleben Marine** is establishing a molten sulphur terminal at Tampa. Beginning in August, a specially designed ocean-going ship will ply between the TGS terminal at Beaumont (see Texas) and Tampa, carrying 7500 tons of the molten sulphur, making it the largest carrier ever used for liquid sulphur shipments. In addition to the molten capacity, the ship can carry 2500 tons of solid sulphur or other dry bulk, and alternatively the ship can handle 8000 tons of dry cargo, which it is planned to do on return trips.

DeBardeleben will have by August initial storage capacity of 12,000 tons of liquid sulphur in steam-heated tanks, and barges of smaller capacity for re-distribution coastwise from Tampa.

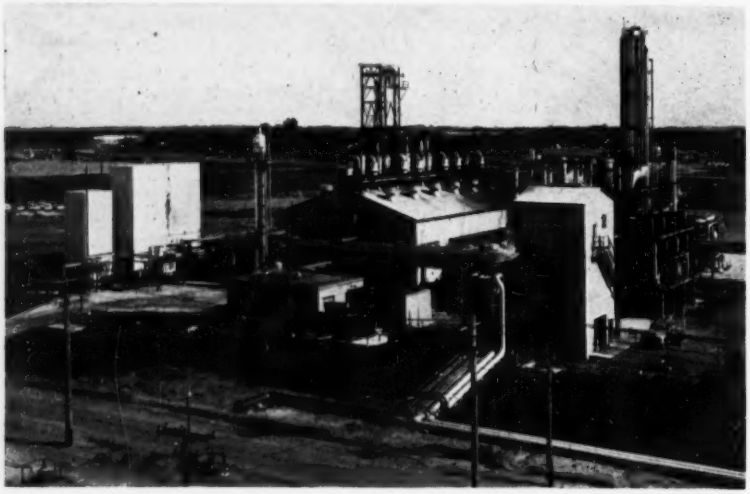
* * *

Virginia-Carolina is experimentally planting citrus groves on rehabilitated land at Bartow. Vice-president **Charles E. Heinrichs** believes this is the first such planting that has ever been made on former phosphate land. The initial test is a 12-acre tract.

* * *

Citrus Culture Corp. is building a $250,000 plant on the ashes of the Mt. Dora plant that burned last September. It will be a complete, 135 x 165 foot mixing plant. President **J. E. Fortner** says the plant should be in operation first of next month.

The St. Paul Ammonia Products, Inc. ammonia products plant at Pine Bend, Minnesota, has been operating at rates above the design capacity of 200 tons per day of ammonia. Close cooperation between Lummus, who designed the plant and St. Paul Ammonia's capable staff have achieved a successful project. In addition to producing anhydrous ammonia and ammonium nitrate solutions for the fertilizer industry, St. Paul also produces anhydrous ammonia meeting industrial specifications. St. Paul Ammonia employs the Texaco Synthesis Gas Generation Process to produce hydrogen for ammonia synthesis. During most of the year, natural gas direct from the pipeline is the raw material. However, during the cold Minnesota winters the supply of natural gas is interrupted, giving preference to household users. The plant is designed so that at these times butane is used as the raw material. The large compressors are gas-engine driven and use natural gas fuel except during the winter months, when propane from storage tanks is employed. The Lummus design fits the plant to the needs of the area and permits this sort of flexible operation. This plant utilizes a hot potassium carbonate system for removal of CO_2, which helps in reducing the costs of production. Lummus acted as general contractors for the entire project which includes ammonia synthesis, nitric acid, and ammonium nitrate solutions units, and offsite facilities including utilites, tankage and product shipping.



GEORGIA

Armour Fertilizer Works, Atlanta, has a **TVA** license to use their process and apparatus for the ammoniation of superphosphate.

* * *

Saye Fertilizer a division of **Rutledge Mfg. Co.,** Rutledge, is producing Saye Green, a packaged fertilizer for lawns, shrubs, and ponds, which is being distributed by **Pennington Grain and Seed.** The analysis includes trace minerals, and they are making a feature of these in advertising.

* * *

National Gypsum is boosting Savannah capacity 25%.

IDAHO

San Francisco Chemical, Montpelier, has announced the acquisition of holdings estimated to contain nearly 15,000,000 tons of convertible, high level phosphatic material in the Crawford-Leefe area, which will assure them of reserves there for more than 40 years. With control of the 15 patented claims of the old **U. S. Phosphate Co.** they have a total of 25 claims, which include seven miles of strike outcrop.

KANSAS

Marc and John Lamoreux and **Mel Elliott,** Waterville, will start a fertilizer plant making both liquid and granulated dry mixed grades.

LOUISIANA

Pelican State Lime Corporation has been chartered at Morgan City with capital stock listed at $400,000. Address, 819 Brashear Ave.

* * *

Louisiana Limestone Distributors, Inc., has been chartered for $18,500 at 121 Bolton Ave., Alexandria.

MAINE

Eastern States Farmers Exchange, Maine's newest fertilizer plant at Detroit, recently held a three day open house. It is equipped to turn out ten grades of fertilizer to suit local needs.

MARYLAND

Wm. B. Tilghman Co., Salisbury, publish "The Tiller" a house-organ we review regularly. The current issue reveals an interesting service they render their friends,—free classified ads of all kinds, which occupy a good half of the issue.

MINNESOTA

American Agricultural Chemical have announced the purchase of a 64-acre site at Sleepy Eye. Vice president **B. R. Richey** has indicated that a plant may be built there at some future date.

MISSISSIPPI

First Mississippi Corporation has called our attention to our reference to them as "cooperative-owned" in the February issue, and points out that they are not.

* * *

Southern Fertilizer Activite Co., Inc., has been chartered at Edwards with capital stock of $150,000.

MISSOURI

Paul Skaggs and Sons have opened their new bulk fertilizer plant in Fredericktown on Villar Street. Their main office will continue at 400 N. Main St.

NEW JERSEY

Dixon Chemical now expect their $5,000,000 sulphuric acid plant in Paulsboro to be ready in September, with a capacity of 30,000 annual tons. They plan to build later this year an aluminum sulfate unit in Newark.

OHIO

Weiker Grain Company, Van Wert, have completed their fertilizer plant, and are producing complete fertilizer. Their production is about 450 weekly tons on a 40-hour week basis. They have 1000 tons storage capacity. Equipment includes two tractor loaders, a belt conveyor, a mixer, two elevators, and two sets of scales—one a truck scale. **O. J. Weiker, Jr.** is general manager.

TEXAS

Texas Gulf Sulphur has announced plans to enlarge its present marine shipping facilities at Beaumont to the tune of $3,000,000. A 3600 foot canal, 36 feet deep, capable of handling a 15,000-ton tanker, will connect the Neches River with their storage area, where a turning basin will be dredged. The whole project is contained entirely on their property. It will be prepared to handle both molten and bulk sulphur shipments (See Florida).

* * *

Farm and Ranch Fertilizer Co. expects to begin this Summer with 20,000 annual ton initial production at their new $150,000 fertilizer plant at Clarkwood, near Corpus Christi. This plant will produce pelletized fertilizer, while their Alpine plant produces dry mix fertilizer.

WASHINGTON

California Spray-Chemical has awarded construction to **Chemical Industrial Corp.** for their $5,000,000 development at Kennewick, according to Calspray's vice president and chief engineer, **Phil S. Williams.** The project includes a nitric acid and an ammonium nitrate plant.

WEST VIRGINIA

Morgantown Ordnance Works, the $63,000,000 wartime ammonia plant, was relinquished by **Olin-Mathieson** last year, as reported here at the time. It was put up for bids by **General Services Administration,** without what GSA calls a "responsive bid." Under the law sale of the plant may now be negotiated.

Full details of the plant, which would cost $167,000,000 to reproduce today—according to **Singmaster & Breyer**—may be had from **Joe L. Moody,** director, Acquisition & Disposal Division, Public Building Service, General Services Administration, Washington, D. C. It was originally offered on a "sale or lease" basis, in one parcel or two.

ARGENTINE

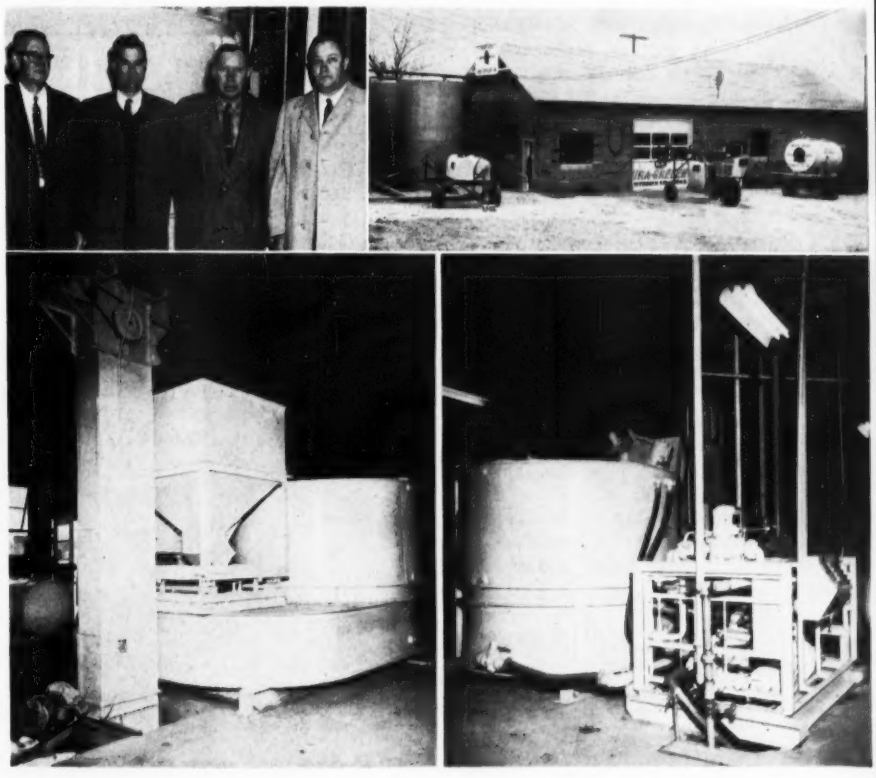
SOMISA, steel producer, wants to build three blast furnaces, one this year, another in 1962, the third about 1969. Each furnace should turn out some 7,900 annual metric tons of ammonium sulfate and other derivatives. Now they want a US concern to help develop outlets.

AUSTRIA

Austrian Nitrogen Works, Linz, increased its volume 80,000 tons dur-

COMMONWEALTH'S NEW LIQUID OPERATION

Commonwealth Fertilizer Company, Russellville, Ky., has recently opened their new $100,000 liquid fertilizer division. The machinery was built and installed by the Standard Steel Manufacturing Company of Indianapolis, and is a continuous type acid neutralization operation with a capacity of 20 hourly tons of complete NPK liquid mixes. The liquid division includes the manufacture and sale of complete liquid fertilizers, as well as anhydrous ammonia and direct application nitrogen solutions. Jack Davis will manage the division. In the pictures below are shown: Top left, Board of Directors, left to right: Nat H. Love, Ira L. Fears, M. G. Williams and J. A. Hicks; right, Commonwealth's new liquid fertilizer plant. Below left, mixing unit showing potash elevator and weigh hopper; right, mixing unit showing control panel and activator.



ing 1928, to 980,000 tons. The increase was largely in superphosphate and from the new granular and urea lines.

CANADA

Electric Reduction Co. of Canada, Ltd., has announced a multi-million dollar program in Ontario. This includes plants for sulphuric and phosphoric acids. These will be located at Port Maitland, where the Grand River enters Lake Erie.

* * *

Consolidated Mining and Smelting has reported to us the immediate construction of a $5,000,000 urea plant at Calgary, Alberta. These will be operated in conjunction with their present ammonia and fertilizer plants there, and will have a capacity in excess of 36,000 annual tons.

* * *

Gypsum, Lime and Alabastine Canada Ltd. has integrated into its operation the new $350,000 pulverized limestone plant at Beachville, Ontario. At full capacity it is scheduled to produce 30 hourly tons. Full capacity is expected to be reached early in the new year. During the past 10 years they have put $12,500,000 into modernization which has brought a very substantial increase in production.

EIRE

Siat Patrick Copper Mines, Avoca, County Wicklow, will be the source of pyrites from which superphosphates will be produced by a new company being formed there.

GREECE

The Government is planning a 270 daily ton ammonia plant at Ptolemais, Macedonia, and needs some $13,500,000 foreign capital to finance. West German and French concerns will probably build the plant.

YUGOSLAVIA

The Rudnap plant, at Lukavaz, Bosnia which was reported here last month is expected to produce 100 daily metric tons of anhydrous ammonia; 340 metric tons of nitric acid, 380 metric tons per day of nitrochalk containing 20.5% N. All these operations will use **Fauser-Montecatini** processes. As reported previously, **Montecatini and Ansaldo** will handle construction and equipment.

Agrico Water Soluble, an easy-to-use, completely soluble 17-17-17 granular plant food will be available to home gardeners, golf courses and nurserymen this spring, according to an announcement by The American Agricultural Chemical Company. The product is available in 8-ounce jars and 3-pound foil packages for home use, and in 50-pound drums for commercial and industrial use, with full information on proper use.

MICHIANA BUILDS ON IDEAS

The Michiana Chemical Co., Niles, Mich., is a new fertilizer outfit, and one with ideas. The picture shows the latest of these. It is a 4' x 4' plywood box which has been patented by Alfred Oines and Robert Freske, who own and operate the six-months old plant.

This box, which they call the good right arm is there for the free use of the customers in filling bulk plant food into spreaders. Instead of shoveling, the fertilizer flows direct into the spreader from the box on the truck. It costs about $38 to make, and has a positive shut-off gate, with canvas or plastic sleeve spout. The boxes are loaded on the customers' trucks at the plant with a fork lift. Capacity of the boxes is 1 to 1½ ton of fertilizer.

Michiana should be familiar to our readers because we have reported how they converted an old railroad roundhouse into a fertilizer plant. Last month, the 100th carload of chemicals rolled into the roundhouse, and at the same time a thousand visitors came in to help celebrate the "anniversary." A picnic was served, door prizes were given—and a festive air permeated the whole part.

Michiana is now serving 28 towns in Michigan and 7 in Indiana with eight grades of fertilizer under the Spartan trade name.

Safety Section Sets Meeting Dates

The bi-annual spring meeting of the executive committee of the Fertilizer Section of the National Safety Council was held in the Heart of Atlanta Motel, Atlanta, Georgia.

The vice-chairman, Elmer Perrine, advised the board that the 1959 meeting would be held in Chicago on October 19 and 20 at 2:00 P.M. The vice-chairman will furnish the secretary with a tentative schedule of the program.

An address of appreciation to the sponsors and regional directors of the schools was made by W. C. Creel. A motion made and seconded that the Fertilizer Safety School be continued in 1959 carried.

Dates for Schools—Southeastern, Aug. 27-28; Northeastern, Aug. 12-13; Southwestern, Nov. 12-13; Midwestern and Western, to be announced.

Paul Truitt requested that all checks for school attendance be made payable to National Plant Food Institute. Mr. Truitt advised that a budget of $2500.00 had been approved for the schools. Announcements and programs for schools are to be made sixty days in advance. Registration fees will include only those extras (materials, luncheons) that the respective school directors deem necessary. The cover sheet for programs will be standardized for all schools.

Board of Directors were informed that this Section would not participate in the Southern States Safety Conference this year. The next bi-annual executive committee meeting will be in Roanoke, Va., on June 4.

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NEW 50% SOLUTION GIVES YOU MORE NH_3 PER SHIPMENT

Because Texaco has the handling know-how and equipment, it is now practical to ship aqua ammonia at 50% concentration in either tank cars or tank trucks. You get 57% *more* ammonia than in the same volume of regular 29.4% solution.

At your plant, 50% solution is unloaded and diluted to 29.4% without additional investment in handling equipment.

Thus, two tank cars of Texaco 50% NH_3 solution actually give you more ammonia than three cars of the standard 29.4% solution–saving you shipping costs on one car.

Only Texaco offers you this advantage. In addition, Texaco's technical advisory personnel will be glad to discuss with you any questions concerning this unique saving, development of a new product or improvement of an old one. Possibly Texaco research has already solved a problem similar to yours, saving you the expense of duplicate experimentation.

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Meetings

At Yakima Fertilizer Dealers Meeting—from left to right, Scott Hanson, Program Chairman, Collier Carbon & Chemical Corp.; Red Bertramson, soil testing panel moderator, Washington State University; Emil Nelson, principal soil fertility speaker, Irrigation Experiment Station; Leon S. Jackson, Executive Secretary Pacific Northwest Plant Food Association.

Western Washington Forestry Association Fertility Panel study the effect of Fertilizer applications on a Douglas Fir specimen. Left to right, F. Todd Tremblay, Pacific Northwest Regional Director, National Plant Food Institute; Ken Turnbull, University of Washington; Darrel Turner, Western Washington Experiment Station; Stan Gessel, University of Washington; and C. H. Rowles, University of British Columbia.

The National Plant Food Institute's Fertilizer Salesman's Handbook is the focal point of a discussion between Dr. M. H. McVickar, California Spray-Chemical Corporation; Glenn Holt, U. S. Borax and Chemical Corporation; and Dick South, Hanson & Peterson, during the Western Washington Fertilizer Dealers Meeting at Mt. Vernon, Washington.

Book Published For California Banks

The National Plant Food Institute and the California Fertilizer Association, with the assistance of the University of California, jointly have published an attractive 20-page booklet for banks and other lending agencies in California entitled, "More Profits from Fertile Soils in California."

WASHINGTON

"Better Use of More Fertilizer" was the theme of the **Central Washington** fertilizer dealers day in Yakima recently.

Emil Nelson, soil scientist, Irrigation Experiment Station at Prosser, keynoted the theme of the meeting by presenting facts and figures on fertilizer recommendations for the irrigated crops.

F. Todd Tremblay, Northwest Regional Director for NPFI, presented some of the results of the Washington Five-Acre Corn Contest.

Dr. Al Halvorson, soil testing specialist from Washington State University, discussed the college soil testing program.

Dr. Billy Bond discussed the use of bulk blending of fertilizers in today's modern fertilizer plants.

The highlight of the day's program was the soil testing panel moderated by Dr. B. B. Bertramson of Washington State University. A lively discussion on the theme, "Does Soil Testing Really Sell Fertilizer" indicated that this was undoubtedly true. The consensus of opinion was that fertilizer dealers would be wise to join forces with the county agents to push the soil testing program in all areas.

* * *

A capacity crowd which attended the 3rd annual **Western Washington Fertilizer Dealers** meeting at Mt. Vernon, Washington, and were presented some interesting facts and figures on forage and tree fertilization needs.

* * *

Over 150 tree farmers and foresters showed a keen interest in the "Progress Report on Forest Fertilizer Use" presented at the recent 15th annual meeting of the **Western Washington Farm Forestry Association.**

The panel which presented some of the recent findings in forest soil fertility was made up of Dr. S. P. Gessel, associate professor of the Forestry Department of the University of Washington, Dr. Ken Turnbull, University of Washington, Dr. C. H. Rowles, University of British Columbia, and Dr. Darrell Turner, Western Washington Experiment Station. F. Todd Tremblay, regional director of the National Plant Food Institute, moderated the panel.

ARIZONA

A six member panel moderated by E. O. Foster highlighted the one-day **Arizona Fertilizer Conference** at the University of Arizona in Tucson. Panelists discussed "Fertilizer Use Economics in Arizona."

Dr. Foster is chairman of the Soil Improvement Committee of the Arizona Agricultural Chemicals Association.

Panelist Lynn Mellor, Olin Mathieson Chemical Corp., discussed grower experience in boosting income with high levels of soil fertility on several Arizona crops.

Dr. Russell Coleman, NPFI executive vice president, stressed the importance of showing crop yields graphically in terms of increased net income. Other panelists were D. H. Walbolt, Shell Chemical Corp.; Lemac Hopkins, California Spray-Chemical Corp.; Lyle Young, Arizona Bankers Association and Dr. Raymond Seltzer, University of Arizona.

In the morning session Dr. Richard B. Bahme, Western regional director of the Institute, outlined NPFI activities in the field of research and education as it pertains to the West.

College agriculturalists reported on field research trials featuring nitrogen and phosphate responses and increases in grain sorghum yields from nitrogen, available phosphate and potash in the morning session.

Sponsoring the conference were the National Plant Food Institute and the Arizona Agricultural Chemicals Association in cooperation with the University of Arizona.

ALABAMA

The **Alabama Soil Fertility Campaign** is rolling in high gear, according to J. C. Lowery, Extension Agronomist with the Alabama Agricultural Extension Service and Frank Boyd, President, Alabama Soil Fertility Society. Kick-off meetings have been held in 20 counties across Alabama during the past few weeks.

Charles Summerour, Secretary of the Alabama Soil Fertility Society and Area Agronomist with the American Potash Institute, has been assisting county agents with the planning, arrangement, and publicity for the meetings.

The Alabama program is another excellent example of cooperation between the fertilizer industry and the State Agricultural Extension Service in conducting an educational program to increase the income of the farmers in the State. Cooperation has come from all segments of the industry, individual dealers, manufacturers, producers, and organizations representing many agricultural enterprises.

NEW MEXICO

The Agricultural Chemicals Conference was held at the New Mexico State University, State College, N. M.

Speakers included Dr. R. L. Beacher, southern regional director, National Plant Food Institute, Seldon Baker of Agricultural Services and several from the NMSU staff.

ARKANSAS

Fayetteville, Arkansas had its name added to a growing list of counties in the United States in which soil testing is being promoted intensively among farmers.

Such a program was launched recently in Lawrence County where more than 200 farmers attended a "Soil Test Festival." Sponsoring the project is the County Agricultural Extension Service in cooperation with the National Plant Food Institute.

MICHIGAN

The timetable for launching the intensified soil testing program in Ionia County, Mich., was announced last month.

This program, sponsored by the National Plant Food Institute and the Michigan Agricultural Extension Service, is designed to encourage more efficient crop production by farmers, through the use of lime and fertilizer. Supervising and correlating the program will be Fred Peabody, county extension director of Ionia county and John R. Guttay, Institute district representative, with headquarters at East Lansing, Mich.

A kickoff dinner is scheduled for May 28, at Ionia, county seat of Ionia County, to get the program officially underway. In attendance will be farmers, county business men, editors and agricultural workers.

The project is part of the program recommended by the Institute's Midwest Research and Education Committee, headed by R. P. Thomas, International Minerals and Chemical Corporation. A Soil Testing task force has advised on plans for the program, under the chairmanship of Leo Orth, Sinclair Petrochemicals.

MONTANA SOIL TESTING

"Increased emphasis will be placed on pushing soil testing in Montana" stated Bernard L. Brown, M.S.C. extension soils specialist at a recent meeting of the **Montana Plant Food Association** at Great Falls. "The soil testing facilities have been moved to the Agronomy and Soils department under the direct supervision of Dr. Murray Klages."

John Reuss, assistant in soils, discussed the native hay fertility experiments he had carried out in cooperation with H. A. Kittams and M. G. Klages. F. Todd Tremblay, regional director of the N.P.F.I., discussed the position of the fertilizer dealer in modern day agriculture.

Newly elected officers for the **Montana Plant Food Association** included George Mason, President, Tom Selstad, Vice President, and Warren Stensland, Secretary Treasurer.

George Mason, newly-elected president of the Montana Plant Food Association discusses Montana's new soil testing program with County Agent Ted Fosse (left) and Bernard L. Brown, M.S.C. Extension Soils Specialist at Bozeman.

FOREST FERTILIZATION GROUP

The National Plant Food Institute's **Forest Fertilization Task Force** met March 24 and 25 at the Dinkler-Plaza Hotel in Atlanta, Georgia, to discuss fertilization research in southern forestry, Dr. S. L. Tisdale, NPFI Regional Director, announced.

The project is under the general direction of Dr. L. C. Walker, Chief Forester of the Institute, and the group is composed of industrial scientists and research foresters.

The Institute project originated as a result of recent interest exhibited by chemical companies toward a coordinated program. About 30 wood-producing industries also have expressed interest in such an effort.

Among the items considered at the Atlanta meeting, according to Dr. Tisdale, was the establishment of a clearing house of experiments underway in order for interested parties to be kept informed of progress in research. The group also agreed to encourage the establishment of a service laboratory to handle analyses of soils and plant tissues. Priorities for forest fertilization research were suggested and requests from research organizations for financial aid were considered.

Other members of the Task Force present at the meeting were: Dr. L. E. Loveless, Monsanto Chemical Co.; Dr. Louis Metz, U. S. Forest Service; Dr. W. W. Rennie, E. I. duPont de Nemours & Co.; Dr. J. E. Sedberry, American Potash Institute; Dr. H. J. Stangel, Allied Chemical Corporation; Donald D. Stevenson, Buckeye Cellulose Corporation; and Dr. F. W. Woods, Duke University. Dr. R. L. Beacher, Dr. W. H. Garman and Mr. E. K. Chandler, all of the NPFI, also participated in the conference.

Virginia Issues Rules On Pesticide Mixing

The Virginia Department of Agriculture has issued a supplement to instructions under which fertilizer-pesticide mixtures may be made for cantaloupes, cucumbers, snap beans, squash, strawberries, tomatoes and watermelons.

BIOCHEMISTRY CONFERENCE PROGRAM ANNOUNCED FOR AUGUST 3-7

The program for the Third Gordon Research Conference on Biochemistry and Agriculture has been announced by Dr. George L. McNew, Managing Director of Boyce Thompson Institute and Dr. Robert S. Bandurski, Professor of Plant Biochemistry at Michigan State University who are serving as co-chairmen of the conference. The conferences, which will cover various chemical aspects of agriculture, will be held at Kimball Union Academy in Meriden, New Hampshire on August 3rd to 7th.

Brilliant and outstanding foreign participants are supplementary to five very enlightened sessions by outstanding authorities in the United States.

Of special interest to our readers is the session on Tuesday, Aug. 4 program for which follows:

Phosphorus in Plant Nutrition

Session Chairman **Dr. G. L. Bridger, Director** of Agricultural Chemical Research, W. R. Grace & Co., Baltimore, Maryland.

9:00 A.M. Chemical Behavior and Plant Availability of Phosphorus Sources in Relation to Soil and Fertilizer Properties. Dr. D. R. Bouldin, Soils and Fertilizer Research Branch, Tennessee Valley Authority, Wilson Dam, Ala.

9:45 A.M. Discussion.

10:00 A.M. Plant Nutrient Uptake from Fertilizer Bands. Dr. A. J. Ohlrogge, Purdue University, Lafayette, Indiana.

10:45 A.M. Discussion.

11:00 A.M. Distribution of Phosphorus in Plants. Dr. C. V. Cole, U. S. Department of Agriculture, Fort Collins, Colorado.

11:45 A.M. Discussion.

12:00 Noon Lunch.

Those interested in attending should write Dr. W. George Parks, Department of Chemistry, University of Rhode Island, Kingston, Rhode Island immediately for application blanks since admission is by invitation. The purpose of the conference is to bring outstanding research personnel from academic, private and industrial laboratories together in a relaxed environment where there will be freedom for full discussion of subjects of mutual interest. By focusing divergent viewpoints and calling upon people of different professional backgrounds who have exceptional knowledge in a given area, it is possible to synthesize and stimulate broad viewpoints that are often missed in more restricted gatherings.

Youths Efficient As Corn Growers

How efficient can you be in growing corn? Spencer Chemical Company has come up with some answers to this question after tabulating the results of its 1958 Efficient Corn Growing Program.

For instance: the 35 top participants in the program grew 4668 bushels of corn on only 35 acres for a total net profit of $2,860.

In its fifth year, the Spencer program lets each youthful participant compete against himself in seeing just what can be done to improve the standard corn growing practices on his farm. His success is measured by balancing the improvement in yield and profit on one acre of corn grown with what he judges to be "improved" practices against the yield and profit from an acre grown with practices normally used. Assisted by his Vocational Agriculture teacher, he is required to keep detailed records and make accurate yield measurements. Improvement in efficiency, as measured by profit rather than bushels, is stressed above improvement in yield alone.

Spencer indicated that the "improved" practices most generally chosen to boost efficiency were: increased use of fertilizer according to soil test, increased plant population per acre, use of adapted hybrid seed and increased weed and insect control. They resulted in an average yield increase of 61 bushels per acre on the "improved" plot. Although this increased the production cost, profit per acre was an average of $42 more than on the less-efficient "normal" practices plot.

Simulated Space Flight Discourages Fruit Flies

Fruit Flies, whirled at 240 revolutions per minute, still go on reproducing—but it takes a lot longer. In fact the yield from a given number of eggs is reduced 60%. This should discourage men who want to found a dynasty somewhere in outer space.

Potash Deliveries Rose in '58

Deliveries of potash for agricultural purposes in the United States, Canada, Cuba, Puerto Rico, and Hawaii by the eight principal American producers and the importers totaled 3,805,057 tons of salts, containing an equivalent of 2,229,724 tons K_2O during 1958, according to the American Potash Institute. This was an increase of 10% in salts and K_2O over 1957. Continental United States took 2,090,659 tons K_2O; Canada, 89,396 tons; Cuba, 16,482 tons; Puerto Rico, 16,528 tons; and Hawaii, 16,659 tons. These figures include imports from Europe of 237,269 tons K_2O.

Exports to other countries were 228,156 tons K_2O, an increase of 11%. Deliveries of potash for non-agricultural purposes amounted to 118,707 tons K_2O, a decrease of 8% under last year.

In the United States, agricultural potash was delivered in 46 states and the District of Columbia. Illinois with over 200,000 tons K_2O was the leading state followed in order by Indiana, Ohio, and Georgia, each taking more than 150,000 tons K_2O during the year. Due to shipments across state lines, consumption does not necessarily correspond to deliveries within a state.

Agricultural potash accounted for nearly 95% of deliveries. Muriate of potash continued to be by far the most popular material, comprising over 93% of the total K_2O delivered for agricultural purposes, with sulphate of potash and sulphate of potash magnesia totalling 7%.

During the fourth quarter of 1958, deliveries for agricultural purposes were 602,216 tons K_2O in Continental United States, 46,104 tons in Canada, 7,702 tons in Cuba, 3,481 tons in Puerto Rico, and 5,074 tons in Hawaii making a total of 664,577 tons K_2O, an increase of 31% over last year. These figures include imports from Europe for July through December. Exports of potash to other countries during the fourth quarter were 47,095 tons K_2O, an increase of 23,011 tons or 95% over last year.

In addition to regularly reported deliveries on the quarterly basis, information from governmental and other sources indicates that during July through December, 1958, there were imports of European potash into the United States, Canada, Cuba, and Puerto Rico of 113,594 tons K_2O as muriate of potash and 26,365 tons K_2O as sulphate of potash. These figures are included in the deliveries for the fourth quarter.

Requests For Soil Tests Show Change In Land Use

Of 4,681 soil samples analyzed for available plant food content at Connecticut's AES in New Haven last year, 2751 represented areas used or to be used for lawns, baseball diamonds, football gridirons, golf courses, roadside areas, and the like. The number of samples in the "lawn" group was half again as many as in 1953.

Five years ago, pastures and farm crops, market gardens, and home gardens, in that order, followed lawns as the principal sources of soil to be analyzed. In 1958 ornamentals were in second place, ahead of all of these, although the number of samples from home gardens stayed about the same. The number of samples from cropland soils fell from 1953 to 1958.

Poly Bags Developed For Standard Bag Equipment

A valve type polyethylene industrial bag, which can be used interchangeably with paper bags on standard valve bagging equipment, was described at the annual meeting of the National Flexible Packaging Association.

E. W. Geigel, supervising engineer of the packaging development group of Monsanto Chemical Company's plastics division, said preliminary tests indicate that the new concept will eliminate the difficulty of satisfactorily heat sealing olyethylene bag closure surfaces contaminated during filling with certain powdery or oily materials.

Mr. Geigel said that pilot quantities of polyethylene industrial bags employing this new concept were made available for testing by Polyethylene Packaging Machinery Co., Unionville, Conn., which also plans to supply equipment to manufacture such bags. A prototype automatic machine, incorporating the findings of the test program, has been designed and demonstrated.

Chipewa Plastics, Inc., of Chippewa Falls, Wis., the primary supplier of conventional heavy gauge polyethylene bags, also has been testing for some time a newly developed self closing valve type bag suitable for use with standard spout filling equipment. Field tests have indicated excellent results.

Dollar purchases of raw food farm commodities ran 11½% ahead in 1958 of the same period in 1957.

How much do YOU know about *SCALES?*

No business machine you own bears a closer relation to your profits than your weighing scales. In honor of "National Weights and Measures Week," celebrated March 1-7, here's an eye-opening question-and-answer quiz in which some of the nation's leading weights and measures officials give the facts about the importance of accurate weighing to every businessman.

Are weighing errors important to a practical businessman?

Yes, indeed. The National Conference on Weights and Measures reports that a mistake of eight ounces per 100 pounds on material selling for $50.00 a ton, repeated 1600 times a day, cost $20.00 per day.

Weighings may be much more frequent than 1600 a day. It's possible to lose many hundreds or thousands of dollars in so-called "trivial" weighing mistakes.

Do weighing errors tend to "balance off?"

Generally, no. When a scale gives an incorrect weight, it is usually caused by a faulty condition of the scale. Thus, as long as that condition continues, the scale will continue to give the same kind of error —in one direction, either short-weight or overweight.

Are most weighing mistakes against the buyer or the seller?

Contrary to popular belief, a survey of leading weights and measures officials across the nation indicates that the majority of scale mistakes are **against** the interest of the seller.

Fairly typical of the responses was that of George W. Bay, head of weights and measures in Missouri, who reported scale errors "approximately 59% against the scale owner, and 41% against the customer."

Friction, over-long use, neglect and improper installation are cited as causes of scale errors by many weights and measures officials.

Mistakes in weighing can be enormously expensive because of large volumes, and hard use on scales. John P. McBride, head of weights and measures for Massachusetts, reported these findings on packages with excessive errors which had to be condemned:

"Of a total of 179,832 packaged commodities . . . 18,807 (10%) were underweight and 32,734 (18%) were overweight. Of 85,357 packages put up at the factory, 8,825 (10%) of those tested were underweight and 16,047 (19%) were overweight."

The mistakes which such errors represent undoubtedly involve many millions of dollars for the nation. For individual concerns, the errors can spell the difference between profit and loss.

Would more frequent accuracy tests of scales help?

Yes. Weights and measures officials all over the nation were emphatic about this. "There should be more frequent inspections of scales, as well as better maintenance," replied J. L. Slaughter, head of weights and measures in Alabama. J. J. Leonard, director of Weights and Measures of New York state, responded: "It goes without saying that the more frequently the scale is tested, the better return the owner will receive from the device and the better all-around weights and measures condition will be found. It does not appear to make a great deal of difference whether the weights and measures official or the scale man conducts the tests so long as the same goal is reached."

Does abuse and improper installation shorten scale life and impair scale accuracy?

Yes. Howard E. Crawford, head of weights and measures in Jacksonville, Fla., reports: " . . . the most common cause of scale errors is excessive long use of scales after all parts have become generally worn beyond reasonable repair . . . in many industries, floor trucks and other vehicles used to carry loads are continually run over floor scale platforms even when the loads are not to be weighed. This weight load is damaging to the weighing device."

To Dry Insects To Death?

Insecticides founded on d r y i n g agents, which literally dry the pest to death, are being experimentally used on crops. The question of cost as well as effectiveness is still in the question stage. But the non-toxicity feature may well be a governing factor in the future.

TVA AIMING AT SUPER ACID FROM WET PROCESS ACID

TVA engineers are trying to find ways to convert commercial wet-process phosphoric acid into a "super" acid.

TVA started producing superphosphoric acid by the electric-furnace route more than a year ago, and the new material has demonstrated a number of advantages. Concentrated liquid fertilizers can be made with superphosphoric acid, which is about 40 percent more concentrated than the usual commercial acid, and there are also numerous possibilities of using it to make high-analysis triple superphosphate and other solid fertilizers.

Superphosphoric acid made by the electric-furnace process imposes some limitations on its use in fertilizers in cost and available supply. Mainly because of lower cost, the phosphoric acid commonly used in fertilizers (except liquid fertilizers) is wet-process or "green" acid. So, a logical step is to see if wet-process acid can be concentrated to make a product with the advantages of superphosphoric acid.

Wet-process acid, a crude material hard to handle and store without special treatment, contains impurities that can clog pumps, lines, and storage tanks. Concentrating the material would seem to make it even more troublesome; but TVA engineers found the opposite to be true.

In tests, wet-process acid was concentrated well above the concentration of commercial acid and, strangely enough, the heavier acid deposited little or no impurities. According to the TVA investigators, the reason for this is that some of the acid is converted to pyro- and poly-phosphates that sequester impurities and prevent their deposition. The heavy acid is viscous but does not seem to be too thick for pumping.

Several other advantages are foreseen for the concentrated wet-process acid. It is more concentrated than the usual commercial acid and could be shipped at substantially lower cost in terms of contained phosphate, provided freight rates are the same. Furthermore, it has proved suitable for making clear, or fairly clear, liquid fertilizers. This is an important advantage, because wet-process acid of the usual concentration deposits a very heavy precipitate when it is ammoniated to make liquid fertilizers. For this reason, most liquid fertilizer manufacturers use the more expensive furnace acid.

When used to make solid mixed fertilizer, the concentrated wet-process acid has the advantage of lower water content, and hence the mixed fertilizer products require less drying. It could be used in making high-analysis triple superphosphate and perhaps other very high analysis products such as ammonium pyrophosphate.

TVA engineers say they are still in early stages of the study and have no well-defined process yet for making the material. They add, however, that the great interest shown by industry points to early development of a process—by either TVA or the industry.

Mississippi Approves 40-Ton Freight Rate

A new freight rate for rail shipment of fertilizer affecting shipments weighing between 30 and 40 tons and going to points within the state has been approved by the public service commission. Mississippi Chemical Corporation of Yazoo City proposed the rate. Under previous rates, shipments weighing more than 30 tons were shipped under the 50-ton rate.

A proposal made by the Southern Freight Association seeking to increase the rate for 30 and 50-ton shipments and suggesting a 40-ton rate only slightly under the 50-ton rate was turned down by the commission.

Co-op Associations More Than Doubled

The number of member associations which distribute Co-Op fertilizer has risen from 347 in 1954 to 848 now, Alvin H. Stephenson, director of the Fertilizer Division of the Consumers Cooperative Association of Kansas City, Mo., said. The dollar volume of fertilizer distributed to farmers has increased 200 percent from about $5 million to nearly $15 million. A total of $26 million is invested in Consumers Co-Ops' fertilizer plants.

Nitrogen Division Renames Uran

Nitrogen Division, Allied Chemical Corp., has changed the color and the name of its Uran nitrogen solution. The product, in all of its grades, is now golden colored rather than clear and is named Golden Uran.

The changes were made, Nitrogen Division announced, so that Golden Uran could be readily identified as the genuine and original Uran and not be confused with urea-ammonium nitrate solutions made by other companies. Nitrogen Division, first to manufacture and sell urea-ammonium nitrate fertilizer solutions, introduced them in 1951.

Except for the new color, no changes have been made in the product itself, Nitrogen Division explained.

Anchor Issues Dealer Kit

A well planned kit of "promotional tools for Anchor dealers to raise a money crop in 1959" has been issued for Anchor Phosphate Fertilizers by Wilson and Geo. Meyer & Co., San Francisco. Anchor advertising is prepared by the San Francisco office of Foote, Cone & Belding, advertising agency.

A feature of special interest is a Quiz Pad, easy to tear off and covering legumes, vegetables, sugar beets and small grains. Each quiz makes the observer think about the why of proper use of phosphate fertilizer. And these quiz sheets tie up with the Anchor advertising in Western, national and regional farm publications.

A full kit of merchandising aids is offered along with these features.

obituaries

George C. Bollinger, 48, chief chemist American Agricultural Chemical Co.'s chemical control labratory at Baltimore, Maryland, died March 25. He had been with the company since 1928.

Omar Sanders, 67, consultant to National Potash, and associated with the fertilizer industry for 40 years, died at his home, Sarasota, Fla., Mar. 29.

Jerry G. Woods, general manager Chemical Division, Mississippi River Fuel Corporation, died of a heart attack March 25th while on vacation with his family at the Arizona Manor, Phoenix, Arizona.

LAWNS NEED NITROGEN SUPPLEMENT IN SUMMER

by H. G. M. Jacobson

Connecticut Agricultural Experiment Station

Grasses feed voraciously on nitrogen. During the growing season when mowings are removed nitrogen becomes deficient unless supplemental nitrogen is supplied. Also during heavy rains soluble nitrogen is lost through leaching and runoff. A nitrogen source which would become available slowly during the growing season should prove ideal for turf. The urea-formaldehyde material possibly fulfills this qualification.

In the spring of 1956 an investigation was started in a group of 48 plots of grass. These plots had been previously treated in quadruplicate with various organic materials. Twenty-four of the plots were designed for organic nitrogen (urea-formaldehyde) and twenty-four for mineral nitrogen (ammonium nitrate). This plan provided duplicate plots of the previous treatments. On April 6, organic nitrogen plots received 25 pounds of a 5-10-5 and 8 pounds of 10-6-4 fertilizer per 1000 sq. ft. in which the nitrogen source was urea-formaldehyde nitrogen. The mineral nitrogen plots received 25 pounds of a 5-10-5 fertilizer per 1000 sq. ft. in which ammonium nitrate was the nitrogen source. All the fertilizers were worked into the soil and the plots were seeded to a grass mixture consisting of 45 per cent Merion blue grass, 45 per cent creeping red fescue, and 10 per cent Astoria bent.

In September 8 lbs. of a 10-6-4 mineral fertilizer was applied to the mineral plots.

For the second year and third year following, 18 lbs. per 1000 sq. ft. of a 10-6-4 organic nitrogen fertilizer was applied in early spring to the organic nitrogen plots. The mineral nitrogen plots received 10 lbs. in the spring and 8 lbs. in the fall per 1000 sq. ft. of a 10-6-4 fertilizer containing the clippings dried and weighed.

The water-free weights of the clippings from the mineral nitrogen plots in 1956 were 17 per cent greater than those from the organic nitrogen plots. From July 27 to September 20 the organic nitrogen plots yielded heavier clippings than the mineral nitrogen plots. In 1957 the clippings from the mineral nitrogen plots were only 5 per cent greater while in 1958 the organic nitrogen plots yielded 2 per cent more grass clippings than the mineral nitrogen. The clippings from the organic nitrogen plots were greater from June 8 to September 3 for 1957 and 1958.

From the results of this test it now appears that 20 pounds per 1000 sq. ft. of a 10-6-4 fertilizer, consisting of 50 per cent organic and 50 per cent mineral nitrogen, applied in early spring would adequately meet the nitrogen needs of lawn grass.

One pair fits exactly

It pays to buy nitrogen with care. Select a supplier who fits your requirements exactly – as one key fits a lock.

Before you buy, check these points: Does the supplier offer top quality nitrogen products? Are they readily available even during peak seasons? Moreover, can you get prompt, reliable, low-cost delivery?

Sinclair is in a position to fill all of your requirements – exactly. We can speed top quality nitrogen products to you from Hammond, Indiana – the center of the Midwest's transportation system.

Vast storage facilities for anhydrous ammonia and nitrogen solutions assure delivery where and *when* you need it. So make Sinclair your key source!

Anhydrous Ammonia • Ammonium Nitrate Solutions • Aqua Ammonia • Nitrogen Fertilizer Solutions • Aliphatic Solvents • Odorless Solvents • Aromatic Solvents • Heavy Aromatic Solvent • Toluene (Nitration Grade) • Xylene (Five Degree) • Para Xylene • Propylene Tetramer • Sulfur • Sulfonates (Oil Soluble) • Corrosion Inhibitors • Lube Oil Additives

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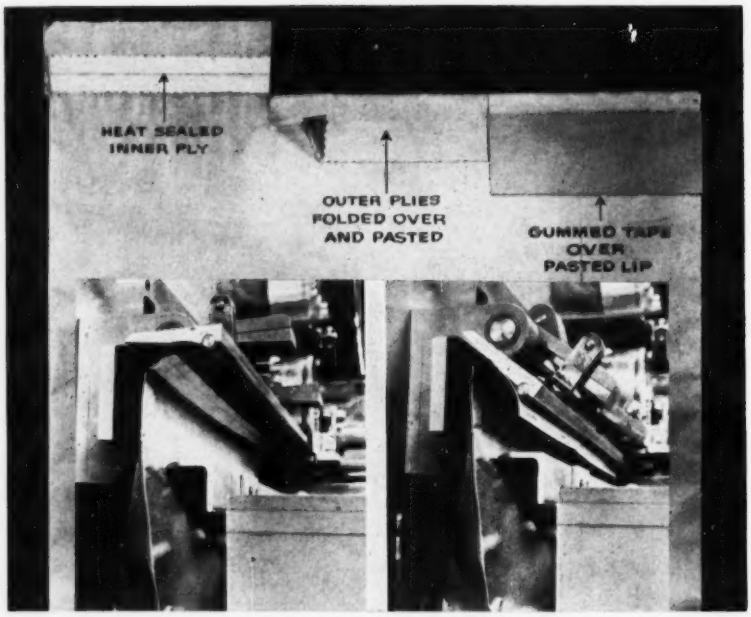
UNION BAG—CAMP SHOW TRIPLE SEAL CLOSURE

A revolutionary, low-cost solution to the problem of packaging hygroscopic, deliquescent, corrosive, semi-liquid or other hard-to-protect products will be unveiled by Union Bag-Camp Paper Corporation at the National Packaging Exposition starting April 13, 1959. This latest Union-Camp development is a uniquely designed multiwall paper bag called Uniseal. The bag is used in combination with a special closing machine, also developed by the company. The result is a completely heat sealed, liquid and air-tight package which eliminates the problem of excess moisture pickup by the packaged product:

The Uniseal bag is constructed in the form of a tube from two to six plies of paper. The inner ply is coated with polyethylene or any other heat sealable material. The plies are made up of various combinations of kraft paper, kraft and foil or polyethylene coated kraft and foil.

The outer plies of the bag are staggered or offset, leaving the inner ply exposed to take a direct heat seal application.



After forming bag top, operator presses button to activate machine. Two plates move on horizontal plane against both sides of bag. This evacuates air from above the bag's fill line. It also acts to hold formed bag top in position. Bag enters between heat-sealing bars. When bag is in correct position, bars press against inner ply. After heat sealing, adhesive is applied to the inside of the outer plies as bag moves to next station. Tape is next applied to outside of outer plies. Finally the pasted and taped lip of the bag is folded over and pressed against the face of the bag, completing the closure.

SAFETY CONTEST WINNERS ANNOUNCED BY FERTILIZER SECTION

The Fertilizer Section of the National Safety Council has announced the winners in three major groups of the 1958 safety contest. There were 170 concerns completing the contest, 79 of which had a perfect record for the 12 month period. The 170 reported a total of 27,749,000 man hours worked, with a total of 247 injuries. This was a 19% drop in the net injury rate as against 1957.

The winners:

Division I, Group C, 12,000 man-hours: J. R. Simplot, Swink, Col.; Southern Fertilizer & Chemical Co., Roebuck plant.

Division II, Group B, 48,000 man-hours: Consumers Cooperative Association, St. Joseph, Mo.; and their plant at Eagle Grove, Iowa; Virginia Carolina, Charlotte, N. C.; Swift & Co., Agricultural Chemical Division, North Portland, Ore.

Division III, Group B, 72,000 man-hours: all Virginia-Carolina, at Durham, N. C., Lynchburg, Va., Rome, Ga.

SUMMARY OF CONTEST EXPERIENCE

DIVISION	Jan.-Dec. Freq. Rate	% Change from Jan.-Dec., 1957
All Divisions	8.90	—19%
Division I (Dry Mix Units)	12.41	+ 5%
Division II (Wet Mix Units)	9.25	—28%
Division III (Fertilizer Plants)	11.60	—14%
Division IV (Open Pit)	4.20	—37%

INDEX TO ADVERTISERS

CLASSIFIED ADVERTISING

RATES: single issue, 8c per word; two issues, 12c per word; three issues, 15c per word: add 4c per word for each insertion beyond three issues. 'For Sale', 'Exchange' and 'Wanted' advertisements accepted for this column must be **paid in advance.**

HELP WANTED

PRODUCTION SUPERVISOR

Production Supervisor for new granular fertilizer plant in Ohio. Experience in front line supervision of granulation, shipping and some plant maintenance helpful. Permanent salaried position with well-established, medium-sized company offering group insurance, pension plan and other benefits. Box #12, % Commercial Fertilizer, 75 Third St. N. W., Atlanta 8, Ga.

POSITION WANTED

AGRONOMIST, M. S., Age 35, single, extensive experience in domestic, foreign and tropical agricultural field. Desires responsible position with progressive concern. Internaticnal technical liaison, sales position preferred. Address Box # 11, % Commercial Fertilizer, 75 - 3rd St., N. W. Atlanta 8, Ga.

PLANT SUPERINTENDENT—22 years in the fertilizer industry and well experienced in maintenance and plant operations. Box #10, % Commercial Fertilizer, 75 Third St. N. W., Atlanta 8, Ga.

EQUIPMENT FOR SALE

FOR SALE—1 New Stedman Type BX 20 x 18 Hammermill equipped with 4 row rotor with ⅞" manganese hammers and complete with 220V reduced voltage type compensator. Mill direct connected to 20 HP, 1200 RPM, 220/440 Volt, 3 Phase, 60 Cycle Totally Enclosed Fan Cooled Motor. Mill and motor mounted on integral base. Box # 20, % Commercial Fertilizer, 75 - 3rd St., N. W. Atlanta 8, Georgia.

FOR SALE: 900 - 32" x 48" hardwood pallets, loaded twice, 5-4" top boards, 3 runners, 2-4" bottom boards, Long screw nails used. Box 9, % Commercial Fertilizer, 75 - 3rd St., N. W. Atlanta 8, Georgia.

EQUIPMENT FOR SALE: 1 St. Regis Valve Bag Filling Machine Model 301 P B X Serial 6875, 5 inch Spout. Extras Include:—1 Feeder Belt; 1 V Type Bag Rest (80-100 lb.); 1 V Type Bag Rest (25-50 lb.); 1 Flat Bag Rest; 1 Safety Switch for Wheel Cover. Practically new. Box # 4, Commercial Fertilizer, 75 Third St., N. W. Atlanta 8, Georgia.

FOR SALE: 2-7'6" x 55' and 80" x 65' Rotary Dryers, 3 - Louisville 6" x 50' Rotary Steam Tube Dryers, also Mixers, Storage Tanks, Screens, Elevators. Send us your inquiries. BRILL EQUIPMENT COMPANY, 2401 Third Ave., New York 51, N. Y.

FOR SALE: Dewatering Presses, Davenport # 1A, # 2A, # 3A, Louisville 8-roll 36". Aluminum Tank 4,000 gal. (6) Louisville Rotary Steam Tube Dryers, 6' x 50', 6' x 25'. Screw Conveyor, Trough Belt Conveyor, Bucket Elevator, Bins, etc. PERRY EQUIPMENT CORP., 1426 N. 6th St., Philadelphia 22, Pa.

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